Commercial Fisheries Abstracts

a monthly summary of important developments for the fishery industries

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FISH & WILDLIFE SERVICE

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FISH AND WILDLIFE SERVICE

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Commercial Fisheries Abstracts

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The abstracts in this leaflet may be left in their present form; but it is suggested that to make the most efficient use of them, they be cut out on the lines designated and filed by the number in the upper left-hand corner of each. For a full description of this filing system see "Fishery Technological Abstract Card System" by Maurice E. Stansby and K. L. Osterhaug, Fishery Leaflet No. 232, obtainable free by request from Fish and Wildlife Service, Washington 25, D. C.

In addition to the regular abstracts, there is included a bibliography of references of secondary importance (without abstracts). These may be cut off on the lines designated and pasted on standard 3 x 5-inch cards for filing.

Following is a brief outline of this filing system. The numbers apply to the first digit appearing on each card. For the meaning of subsequent digits, please see the above described leaflet.

0	General and theoretical	5	Vitamins
1	Fish by species	6	Fishery byproducts
2	Fresh fish	7	Analytical Methods
3	Preserved fish	8	Composition
4	Oils	9	Miscellaneous

Issued with the approval of the Bureau of the Budget, December 29, 1953

0.32 THE PREPARATION OF LONG CHAIN N-ACYLAMINO ACIDS

Jungermann, E.; Gerecht, J. F.; and Krems, I. J.
Journal of the American Chemical Society 78, 172-174 (January 5, 1956)

A series of long chain acylamino acids were prepared by treating an acid chloride with the appropriate amino acids in an aqueous system. When the dicarboxylic amino acids were used and the acylation effected in an organic solvent, the N-acylamino acid anhydrides were obtained. Some of the physical properties of the long chain N-acylamino acids and their salts are reported.

They synthesized the following two series of acylated amino acids: (1) the sarcosine derivatives, varying the chain length and nature of the acyl chain; (2) the lauroyl and/or palmitoyl derivatives of other amino acids. The acid chlorides of fatty acids were prepared by the action of phosphorus trichloride or oxalyl chloride on the acids and distilling. All common amino acids were obtained from commercial suppliers. The preparation of N-propylglycine is described and is typical of other N-alkyl substituted amino acids used. Similarly, the preparation of N-decanoylsarcosine is described.

 ABSTRACTER: Edward H. Gruger

0.33 DISCOLORATION OF MUSCLE PREPARATIONS FROM CODLING (GADUS CALLARUS) BY DEGRADATION PRODUCTS OF 1-METHYLHISTIDINE

Jones, N. R. (Torry Research Station, Aberdeen, Scotland)
Nature 177, 748-749 (April 21, 1956)

In the whole muscle of fish and the separated muscle extractives, reactions between amino-compounds and ribose (Maillard-type reactions) may take place very readily; the free glucose in the muscle is less reactive. However, evidence has been accumulating in this laboratory that such reactions may not contribute all the discoloration found in the muscle of codling under certain processing conditions.

Freeze-dried preparations of muscle extractives showed relative humidity/'browning' relations atypical of Maillard reactions, and considerable quantities of free sugars have been detected in badly 'browned' samples of stored vacuum contact-plate-dried muscle. High sugar values have also been found in 'browned' samples of freeze-dried muscle prepared at this Station and afterwards stored over phosphorus pentoxide at room temperatures (~15° C.) in daylight (conditions which would largely eliminate Maillard reactions). In darkness, little or no 'browning' was observed under these zero-humidity conditions.

In investigations into the enzymic hydrolysis of anserine (β-alanyl-1-methylhistidine) in the muscle of codling, it was reported that synthetic dl-1-methylhistidine was unstable and developed discoloration in light. As the natural amino-acid is liberated rapidly in the muscle after death (to some 60-80 mgm. after 8-10 days storage in ice at an ambient temperature of 2° C.), it was thought that 1-methylhistidine degradation could contribute appreciably to any discoloration taking place during processing and storage of dehydrated fillets. For the present study, dl-1-methylhistidine has been prepared by the hydrolysis of anserine-containing fractions from pike (Esox lucius) and fractionating the hydrolysate by displacement from 'Dowex 2 (OH)' resin columns with N/50 hydrochloric acid.

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 Reprinted in part

0.36 APPEARANCE OF LACTIC ACID IN THE BLOOD OF KAMLOOPS AND LAKE TROUT FOLLOWING LIVE TRANSPORTATION

Black, Edgar C. (University of British Columbia, Vancouver, B. C.)
The Canadian Fish Culturist No. 18, 20-27 (March 1956)

Twenty-five, 2 year old Kamloops trout and twenty-five, 1 and 1/2 year old lake trout were transported in fresh artesian water by tank truck for 1/2 hour over a good asphalt road, 1 hour over an uneven road, and a second 1/2 hour over a good asphalt road. The artesian water at the start of the trip was 95 percent saturated with air, had 30 p. p. m. of carbon dioxide, and had a temperature of 53° F. Pumps re-circulated and sprayed the water on the surface of the tanks in transit. The water at the end of the trip was 97 percent saturated with air, had 10 p. p. m. of carbon dioxide and had a temperature of 62° F. At the end of the trip, the two lots of trout were transferred to a 16-foot covered hatchery trough.

A series of consecutive blood samples taken by syringe from the heart of a different fish at each sampling had levels of hemoglobin and lactic acid shown in tabular form, below.

The data are comparable with unpublished experiments on the effects of 15 minutes of continuous and vigorous exercise in 2 year old Kamloops trout wherein the blood level of lactic acid increased from an unexercised level of 9.2 milligram percent to an exercised level of 75.7 milligram percent. After 2 hours recovery from exercise the blood level had ascended to 117 milligram percent lactic acid. Changes in the sedimentation rate of blood in both species of trout, deep and rapid respiration and no effort to evade capture in the lake trout typified behavior following the transportation run.

From these observations it may be concluded that the lactic acid production and other correlates of muscular activity may be implicated in the death of salmonoids following transportation. Unpublished data of Black (1955) shows a significant reduction in lactic acid in 1-year-old sockeye salmon at the end of 2 hours provided they were allowed to recover in sea-water as compared with fresh water.

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 ABSTRACTER: Martin Heerdt

1.2 CALIFORNIA COOPERATIVE OCEANIC FISHERIES INVESTIGATIONS PROGRESS REPORT

Anonymous
State of California, Department of Fish and Game, Marine Research Committee, Progress Report of July 1, 1953 to March 31, 1955

The California Cooperative Oceanic Fisheries Investigations progress report from July 1, 1953 to March 31, 1955 is concerned with investigation into the sardine fishery. The report is divided into 3 sections: in part 1 the sardine research is briefly reviewed; a formal paper, Population Dynamics of the Pacific Sardine, is presented in the second part; part 3 presents a list of publications by members of the various agencies.

The main fishery of California in 1947-48 faced a wobbling situation; the once plentiful sardine, basis of a great fishery, was becoming scarce. The catch had dwindled from half a million tons to a little over 100,000 tons. Worse was to follow as only 3,000 tons were caught in 1953-54.

Scientists of the California Fish and Game had been investigating the fisheries problem since 1919. Aided by the United States Fish and Wildlife Service since 1937, the research was still limited. In 1947 the Marine Research Investigations was formed by legislation. The scientists had gathered a wealth of information about bad years, but comparable information about good years was badly needed.

Conditions continued to be adverse to the sardine until 1954 when nature conducted a gigantic oceanographic fisheries experiment. Sardines were spawned off southern California earlier and over wider distances than usual. The ocean temperatures off southern California were consistently warmer than in previous years. The scientists could begin to gather data on favorable years.

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 ABSTRACTER: Lois Elgin

N-ACYLAMINO ACID PREPARATION

NON-MAILLARD TYPE BROWNING IN COD

LACTIC ACID IN FATIGUED TROUT

CALIFORNIA SARDINE FISHERY

0.33 (Cross Reference: 1.5)

The extractable free amino-acids and sugars of the muscle of 18-24 in. codling were removed from structural material by exhaustively dialysing homogenates against distilled water. Aliquots of extractive-free suspension, together with dl-1-methylhistidine at a concentration equivalent to 50 mgm. per 100 gm. wet weight original muscle, were freeze-dried over phosphorus pentoxide. They contained 0.3-0.4 per cent 'water' as estimated by 4-hr. heating to constant weight in a forced-draught oven at 105° C. Stored in desiccators over phosphorus pentoxide in daylight at 15° C., the preparations changed rapidly from white to yellow-brown at the surface. Controls with no 1-methylhistidine remained white, as did preparations containing the amino-acid if they were stored in darkness.

When freeze-dried suspensions containing 1-methylhistidine were equiliberated and stored at different relative humidities, it was found that in preparations at high humidities (60-100 per cent relative humidity), a yellow-brown coloration appeared throughout: this coloration did not occur in the absence of the amino-acid and was noticeable at relative humidities as low as 30 per cent. 'Browning' increased rapidly with temperature. During these experiments, controls with no added amino-acid have been checked chromatographically for the appearance of sugar from non-dialysable bound forms, and this has not been found. Under these conditions it is possible that metallic ions bound to protein in a non-dialysable manner could be available to catalyse the degradation.

The present communication indicates that simple compounds of imidazole type may initiate a non-enzymic discoloration of foodstuffs in the effective absence of sugar. It is not suggested that, in the presence of sugar and free amino-compounds under Maillard-reactive conditions, it is likely to be a major factor in 'browning'. Admixture of dl-1-methylhistidine and d-ribose under such conditions gave a dark-brown coloration considerably in excess of the yellow-brown obtainable with the amino-acid alone.

1.2

Agencies of the California Cooperative Oceanic Fisheries Investigations now included: Scripps Institute of Oceanography, California Academy of Sciences, Fish and Wildlife Service, Hopkins Marine Station and California Department of Fish and Game. To date more than 4 million dollars have gone into the program from state, federal and industrial sources. The allocation of this amount and the particular assignments of each agency is given in the report.

To understand the sardine fishery problem there are some general considerations to be made. Fluctuation in abundance and availability of the species, and the fishing effort are contributing causes to the fluctuation in catch. Fluctuations in the fish population result from a variety of causes: fishing by man, predation by other animals, disease, starvation, and so on. Which of these factors is more important has to be determined.

The background of sardine biology and the fishery is given. Very little is known of sardine behavior or the influences of environment upon behavior and distribution. Fishing areas are illustrated. The methods used in measuring the sardine population are discussed.

Many of these factors are discussed in greater detail in the paper, Population Dynamics of the Pacific Sardine.

Although some predictions can be made of the future, more information must be gathered and analyzed. However, it is apparent that there will be no sudden and large revival of the sardine in industry until there are a series of larger year-classes than have recently been produced and until the sardine becomes more available to the fishery.

0.32

0.36 (Cross Reference: 9.13)

Apparently, the buffering action of seawater makes possible an exchange of hydrogen ion and perhaps even lactate ion for other ions in the seawater bathing the gills.

Blood levels of hemoglobin and lactic acid at various times following transportation for two hours

Two year old Kamloops trout				One and one-half year old lake trout			
Minutes elapsed after run completed	Grams	Hemoglobin in Grams per 100 cc	Lactic Acid in milligrams per 100 cc	Minutes elapsed after run completed	Grams	Hemoglobin in Grams per 100 cc	Lactic Acid in milligrams per 100 cc
4	128	11.2	51.0	16	127	4.7	36.5
12	80	10.0	51.9	32	153	10.3	52.2
28	270	11.3	26.0	48	220	11.1	61.8
40	280	11.4	37.0	64	132	9.9	69.4
56	152	10.9	18.5	80	122	..	12.2
72	257	11.7	17.5	84	125	8.2	25.8
88	156	12.3	9.5	96	131	11.1	7.7
104	310	6.1	5.1	108	165	9.6	23.8
112	232	8.4	9.5	116	168	11.8	18.0
120	203	10.6	4.7	124	123	9.9	8.3
128	152	15.9	7.9				

1.0111 MARKETED BRITISH COLUMBIA FISHERY PRODUCTS AND VALUES--1955

Anonymous
Western Fisheries 52, 45 (May 1956)

Following three years of rising production and prices, 1955 was a letdown for most B.C. fishermen. High-priced species of salmon were scarce in all coastal fishing areas. Halibut was plentiful but prices were rock-bottom. Herring fishermen had poor hunting during the first part of the year and were involved in a strike during the latter part, cutting down their year's production by 16 percent.

Marketed value of all B.C. fish and fish products last year was $60,668,000, not including the value of halibut caught by B.C. fishermen and landed in Alaska or the value of tuna canned by B.C. companies from frozen tuna imported from Japan. The addition of these figures would put the total market value up to about $62 million.

This figure is about $10 million less than the market value in 1954. Catch of salmon was only 131 million pounds, the lowest since 1944, and was worth $42.9 million on the market, compared to $50.3 million the year before. Canned salmon was valued at $32.7 million on the markets.

The sockeye pack of 244,821 cases was the lowest since 1943. It was a light year for sockeye on most of the larger streams, and fishermen had expected small catches, but they were not prepared for the almost total absence of the choice 24-cent-per-pound fish.

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 Reprinted in part

1.81 MORRO BAY OYSTERS ARE GROWN ON TIDAL FLATS

Anonymous
National Fisherman 37, 17, 47 (May 1956)

Oyster farms on Morro Bay, California--midway between San Francisco and Los Angeles--sell a large proportion of its oysters in the southwestern states. The combined oyster production on Morro Bay, all of which is handled by one plant, amounts to some 50,000 gallons annually.

The method of producing and harvesting oysters on Morro Bay is unique in that the oysters are planted on tidal flats that are fenced and tended like any other planted crop. When the oysters reach market size, workers in hip boots go out on the flats at low tide and collect the oysters in wire field baskets. The field baskets are emptied into large steel baskets that hold 600 pounds of oysters. At the next high tide an outboard-motor-powered barge goes out and transports the oysters to the packing plant where they are shucked and packed in glass jars for marketing on the fresh market.

Because oysters do not spawn in Morro Bay, seed must be brought in and planted. The seed oysters are imported from Japan at $8.00 per case delivered, 15,000 baby oysters are guaranteed per case. Twenty cases are used to plant an acre of tide flats or bay bottom.

Seed oysters are planted in January simply by shoveling them off a barge as it moves slowly over the selected area.

Enemies of the Morro Bay oysters are negligible. Although bothered at times by the shovelnosed shark and by 2 to 4 foot wide sting rays, the damage done is small. Starfish and other traditional oyster pests are noticeably absent.

Morro Bay oysters feed on plankton in the inrushing seawater and on rotted plant growth and sea mosses. These oysters grow rapidly and are delectable to eat when prepared by any of a number of of different methods.

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 ABSTRACTER: Kathryn L. Osterhaug

1.30 SALMON

Anonymous
Pacific Fisherman (Yearbook Number 1956) 54, 81-119 (January 25, 1956)

The canned salmon production in North America fell below five million cases in 1955 for the first time since 1921--when the controlling factor was economic rather than biologic. The 1955 total of 4,691,155 cases may be compared with an average for the previous 10 years of 6,252,000 cases.

Alaska's 1955 pack of 2,469,746 cases was the smallest pack there since 1910. This may be compared with a territorial average pack for the preceding 10 years of 3,759,128 cases.

An interesting aspect of the 1955 canned salmon production was the packing of 73,640 cases of 4-pound cans in Alaska and Puget Sound. These were largely Cohoes, but included substantial quantities of Pinks and Sockeyes as well.

At the other extremity of can sizes, quarters were quite popular on Puget Sound where 54,415 full cases of these little cans were produced.

British Columbia experienced the smallest pack of Sockeye in a dozen years and also had a poor season for Chums. To brighten the picture the pack of Pinks was the largest since the million case year of 1930, and the Coho pack was the largest since 1951.

Generally speaking, the British Columbia salmon season was regarded as fairly good, from the standpoint of production. The major companies maintained the same number of canneries as in other recent years and, though they were not as active as in 1954, they were active throughout the season.

 ABSTRACTER: Kathryn L. Osterhaug

1.90 NOTE ON ALBUMIN PROTEIN FRACTIONS IN A STURGEON

Dingle, J. R. and Dyer, W. J. (Atlantic Fisheries Experimental Station, Halifax, Nova Scotia)
Journal of the Fisheries Research Board of Canada 12, 646-648 (September 1955)

Proteins extractable at low ionic strength from several species of fish have been studied electrophoretically in the past few years. The availability of a live sturgeon believed to be Acipenser oxyrhynchus, which is an abnormal specimen of sea sturgeon, allowed the authors to investigate proteins of the Chondrostei as contrasted with proteins of the Teleostei.

The sturgeon from which portions of the back muscle were removed for analysis was 80 centimeters in length. Analyses of the back muscle showed moisture 77.8 percent; fat (by ether extraction of the dried muscle), 6.2 percent; total nitrogen, 2.27 percent; non-protein nitrogen, 0.34 percent; protein nitrogen by difference, 1.93 percent; trimethylamine or trimethylamine oxide, none. Cod in comparison contain 2.5 percent protein nitrogen.

A water extract of the back muscle of this sturgeon was studied by electrophoresis according to the method of Dingle et al., 1955. The muscle samples were cut from the sturgeon, stored at 0° C. until rigor mortis had passed, then cut into small pieces, and extracted for 6 hours with an equal weight of cold water. The solution obtained was dialyzed against three changes of a phosphate buffer that contained 0.10 M sodium chloride. This buffer had a total ionic strength of 0.15 and a pH of 6.52. Figure 1, over, shows the descending electrophoretic pattern obtained with a water extract of sturgeon muscle in the phosphate buffer. The peaks are numbered arbitrarily in the descending order of their mobility.

At least ten non-dialyzable components appeared in the extract and all but two possessed negative

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 ABSTRACTER: Martin Heerdt

BRITISH COLUMBIA FISHING PRODUCTION

1955 SALMON PACK

OYSTERS FROM TIDAL FLATS

PROTEIN FRACTIONS IN STURGEON

1.30 (Cross Reference: 9.2)

1.90 (Cross Reference: 0.32)

mobilities. Peak number 11, which is immobile, probably represents an eleventh component as well as a boundary anomaly. The electrophoretic pattern in figure 1 does not closely resemble any of those obtained by Connell (1953) for extracts of 20 different fishes. Connell found that only the lower fishes such as skates have water-extractable components with positive mobilities at pH 7.5. Sturgeon extract components number 10 and 11 with their weak positive mobilities agreeing with the classification of these fish as intermediate between the elasmobranchs and true fishes.

Mobilities calculated from the electrophoresis pattern are shown in Table 1, below. Approximate Gaussian curves were fitted to the pattern in an effort to locate the peaks due to the different components, and to obtain an approximation of their relative areas.

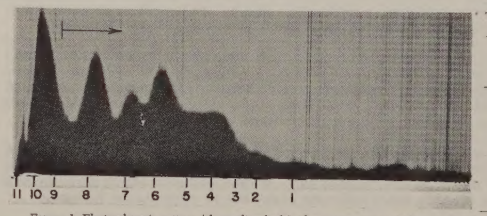


FIGURE 1. Electrophoresis pattern (descending limb) of a water extract of the muscle of short-nosed sturgeon. (Ionic strength = 0.15; pH = 6.52; 2.48 mg. protein N/ml.; 8.7 volt/cm.; 17,200 sec.)

TABLE I. Relative amount and electrophoretic mobilities of the components of a water extract of muscle of short-nosed sturgeon

Peak number	Percentage of total area	Mobility[a] $\left(\frac{cm^2}{volt\text{-}sec.} \times 10^5\right)$
1	1.4	−2.51
2	2.2	−2.11
3	1.9	−1.88
4	9.5	−1.64
5	8.6	−1.36
6	17.6	−1.03
7	9.8	−0.72
8	22.5	−0.36
9[b]	6.6	0
10	18.2	+0.19
11	1.4	+0.37

[a]Ionic strength, 0.15; pH, 6.52.
[b]Should include the α peak which would probably be smaller than the percentage indicated.

1.0111 (Cross Reference: 9.2)

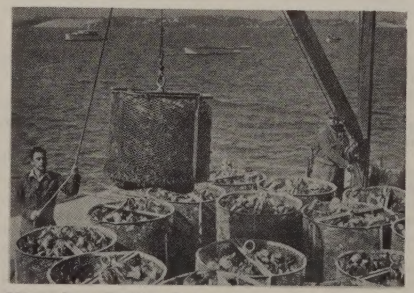
Pink salmon catch of 63.3 million pounds made up 47% of all salmon landings last year. Seiners took about 65% of this catch with gillnetters taking 32%. The catch was all canned, and produced 831,253 cases. Trollers had a better year than 1954, and their earnings, after decreasing steadily for the past five years, began to rise again. Coho landings of 23.5 million pounds were the highest since 1951 and good prices for this species helped bolster the landed value of troll-caught fish. Spring salmon landings totaled 12.1 million pounds, about 1 million pounds less than in 1954. Chum landings totaled only 18.18 million pounds, the lowest reported since 1945, and only 32% of the average yearly landings between 1951-54. Exports of canned salmon dropped nearly $8 million pounds from the record high of $24 million in 1954, but were still the second highest in history. Sales on the Canadian market rose slowly but steadily, carrying on the trend of the past few years and reflecting heavy advertising and hard selling by canners on the domestic market.

The herring catch of 152,846 tons yielded more oil than the 1954 catch and this, coupled with higher unit prices, helped push the market value up to $7.3 million, just slightly under the figure for the previous year. Herring fishing closed in February because of the absence of any large bodies of fish, and a strike (which resulted in a general 14% price hike) tied up the fleet from July to November.

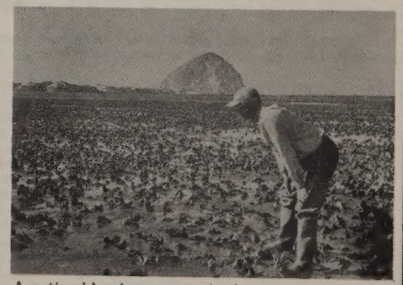
The halibut fishery in 1955 was a sad experience for B.C. fishermen. Total landings of 19.7 million pounds was the lowest since 1950, and low prices to fishermen sent the landed value of the fishery down to $2.5 million. Marketed value declined $2 million from 1954, and totaled $3.9 million.

The statistics have been compiled by the statistical section of the Department of Fisheries.

1.81 (Cross Reference: 1.0114)



Morro Bay, California at high tide, with the oystermen power-lifting 600-pound baskets of oysters from the beds. These baskets are brought to port on outboard powered barges.



A retired businessman who leases commercial oyster beds in **Morro Bay, California** shown inspecting a superb crop of oysters ready for market. Famous Morro Rock which is 576-feet tall, can be seen in the background.

1.5 FOOD HABITS OF GEORGES BANK HADDOCK

Wigley, Roland L. (Fishery Research Biologist)
Special Scientific Report--Fisheries No. 165 (January 1956)

Stomach contents of 1,287 haddock, Melanogrammus aeglefinus, from Georges Bank were analyzed qualitatively and quantitatively. These specimens were caught by means of otter trawls during the period April 1953 to February 1954.

The haddock's diet consisted principally of sedentary or slow moving invertebrate animals; benthic and epi-benthic forms predominated. Small organisms were especially common in the food, presumably because the haddock's rather small mouth precludes taking large items. The percentage volume of each major food group in the diet was as follows: Crustacea - 33.1 percent; Mollusca - 17.5 percent; Echinodermata - 14.6 percent; Annelida - 9.9 percent; and Pisces - 1.9 percent.

Canadian biologists have reported that haddock on the offshore Nova Scotian banks fed predominately on fish. On Georges Bank crustaceans were found to be the primary food; fish constituted less than 2 percent of the food volume. Other notable differences were disclosed in the dietary composition of specimens collected from various parts of Georges Bank itself.

Author's Summary

1.9 FLORIDA FISH MARKETING STUDY

Westerlund, Barton (The Marine Laboratory, University of Miami)
Commercial Fisheries Review 18, 1-5 (March 1956)

The Florida finfish fisheries have suffered a marked decline in the past few years. The decrease can be attributed to three basic factors: (1) increased competition from other seafoods, meat and other protein products; (2) growth of self-service supermarkets with their dependence on frozen processed products; and (3) the failure of the Florida fishing industry to take advantage of the many improvements in production, processing, marketing, and technology that have developed during the past few years. Most segments of the Florida fishing industry have remained static during a period when great changes have been taking place in most other sectors of the American economy.

The most serious problem is in the mullet fishery which is the backbone of the state's fishery economy. Mullet were selling at a good price from 1948 to 1952, and producers had little difficulty in marketing their catches. Some areas in Florida even experienced a shortage of fish during this time. The market price of mullet decreased rapidly after 1953 and steps were taken to investigate the market situation. A pilot study indicated the desirability of doing a complete market study. Research on a contract basis with the U. S. Fish and Wildlife Service was started in October 1954.

The research during the past year has centered around the following points:

1. The past, present, and future markets for Florida mullet.
2. The forces competitive with the markets for Florida mullet.
3. The most promising expansion of present markets.
4. An evaluation of the present methods of handling, preserving, packaging, shipping, and

(over)

ABSTRACTER: Kathryn L. Osterhaug

1.85 COOKED, CLEANED, AND PEELED SHRIMP

Anonymous
Fishing Gazette 73, 47 (April 1956)

A new patented process has been developed in Florida for the preparation of frozen cooked, cleaned and peeled shrimp packed in plastic containers.

In the new process the shrimp are cooked in a sealed plastic container so that they are cooked in their own juices and all of the flavor is retained.

A new production line has been designed for the product. It is unique in the industry as the shrimp are untouched by human hands from the time they are fed into the peeling and deveining machine until they reach the consumer.

The ready cooked shrimp are packed in two sizes: a 5-ounce retail package, and a 1-pound institutional pack for restaurants and hotels. The institutional is packed in five 1 pound packages per unit with ten 5-pound units to the master carton.

The advantages of this type of pack to the institutional user is ease of handling and the absence of shrinkage due to peeling, cooking and deveining. He has improved portion and cost control.

Ease of handling is the chief advantage to the homemaker. She simply runs cold tap water over the envelope for a few minutes and the shrimp are ready to serve in a cocktail or a salad.

ABSTRACTER: Kathryn L. Osterhaug

2.1121 FIFTY YEARS OF CHANGE IN GERMAN HERRING FISHING

Lang, Oskar
World Fishing 5, 46-48 (May 1956)

A retrospective view of fishing in the North Sea reveals the extensive changes that have taken place since 1900. At the beginning of the century the German cutters fishing in the south of the North Sea were using the so-called beam trawl net. The essential part of this gear was a 32 foot long beam with iron stirrups secured to both ends. The beam and stirrups carried the sack-like net and held it open. The ground tow was weighted with tickler chains that scared up the flat fish which formed the main catch at that time. Power for the operation was provided by sail or steam and, if there was a current, it was necessary to fish in that direction. The introduction of the otter boards in 1903 marked the first great progress in cutter fishing.

The beginning of the German trawl herring fishing coincided with the introduction of the high shear-board, or kite. The kite enlarged the opening of the net in a vertical direction and resulted in increased landings of up to 500 to 600 baskets per voyage during the 1920s.

A further important increase in the size of the catch occurred when the kite was moved high above the opening by means of the so-called "false headline". (See illustrations) Formerly the lateral boards were secured directly to the wings of the net, but now fishing was carried out with boards kept away from the wings of the net by two cables of 5 to 7 fathoms in length. These changes resulted in the catching area of the net being much increased.

About 1925 a second kite was added to the herring net making a total of four boards. For this purpose the connecting lines that had been seven fathoms long were lengthened by an additional five

(over)

ABSTRACTER: Kathryn L. Osterhaug

FOOD OF HADDOCK

SHRIMP IN PLASTIC CONTAINERS

MARKETING MULLET

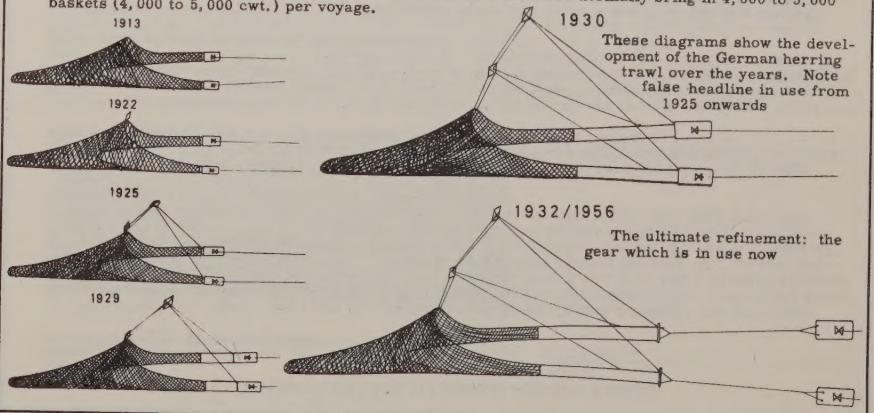
DEVELOPMENT OF TRAWL

1.85 (Cross Reference: 3.26)

2.1121 (Cross Reference: 1.0147)

fathoms.

After 1945 German herring trawler fishing experienced a further increase. As a result of the introduction of fish locating apparatus since 1949 modern trawlers normally bring in 4,000 to 5,000 baskets (4,000 to 5,000 cwt.) per voyage.



These diagrams show the development of the German herring trawl over the years. Note false headline in use from 1925 onwards

The ultimate refinement: the gear which is in use now

1.5 (Cross Reference: 9.14)

1.9 Cross References: 1.0116, 2.6)

selling fish, with the objective of bringing new ideas to the trade.

As a result of the market research, recommendations given are centered around three major points: (1) better quality, (2) new product development, and (3) advertising and promotion.

It is essential that mullet, as well as all other Florida seafood, be of the highest quality when it reaches the market. In order to insure this quality, improvements should be made in the methods of prechilling and boxing fish, the construction and temperature of frozen food cabinets, and the method of refrigeration.

Several "new" mullet products should be tried. More attention should be given to the trend toward packaged and processed fish. Mullet producers should offer a prepackaged item that supermarkets can handle.

Very little advertising is now being done by members of the industry. Industry-wide advertising of Florida fish is unknown. A coordinated advertising campaign by the entire industry would do much to make the public aware of the desirability of mullet as a food fish.

2.1121 COMPARATIVE TRAWLING TESTS WITH MANILA AND NYLON

Anonymous
World Fishing 5, 60, 62, 64 (May 1956)

Preliminary tests observed by a French oceanographer indicated that vessel speed when trawling with a nylon net was about half a knot greater than with a sisal trawl net.

Tests were later resumed on the French research vessel, President Theodore Tissier. The program called for selectivity tests on whiting trawl nets and comparative studies of the behavior of trawl nets made of different materials--manila and nylon.

The vessel carried the following trawls to be tested: Two herring trawls of identical characteristics, one of nylon, the other of manila; four identical whiting trawls with the following characteristics:

	Manila	Nylon
Head line	28 m. (87 ft. 7 in.)	28 m.
Ground rope	40.80 m. (127 ft. 8 in.)	40.80 m.
Mesh at the wings	50 mm.	50 mm.
Mesh in the cod end	43.5 mm.	32 mm.

Measuring equipment.--Traction on the ground rope was measured with a recording dynamometer of 5 tons maximum traction fixed to the deck of the ship and attached to the warp, between the fore gallows and the guide, by means of a lead-line cable-holder.

For observations of traction on the legs there was a recording dynamometer of 4 tons of which the capsule was placed at the end of the leg, near the board.

A watertight casing attached to the head line contained a differential recording manometer and a normal manometer. The former was for measuring the height of opening of the trawl and recording

(over)

 ABSTRACTER: Kathryn L. Osterhaug

2.12 THE VALLEYFIELD-BADGERS QUAY COMMERCIAL LONGLINING EXPERIMENT, 1954

Macpherson, H. D.
Progress Reports of the Atlantic Coast Stations, Fisheries Research Board of Canada, No. 63, 19-22 (November 1955)

The longline fishing experiments for cod conducted along the east coast of Newfoundland, from the northern edge of the Grand Bank to beyond the Straits of Belle Isle, by the Fisheries Research Board of Canada with financial assistance from the Industrial Development Service of the Federal Department of Fisheries, were very successful, resulting in the development of a fishing center at Bonavista.

In 1954 two boats were chartered to carry out a commercial longline experiment on the grounds north of the area fished by the Bonavista fleet. Valleyfield-Badgers Quay being chosen as the most suitable port for this operation and one which might be developed as a center for longline fishing. The two Nova Scotian, Robar type longliners chartered were the 50-foot Ada and Bill II and the 55-foot Gertrude and Ronald, each with a crew of four men including captain. The gear used on the Gertrude and Ronald was the standard type: each tub consisted of twelve 55-fathom lines with 50 to 52 hooks per line. The Ada and Bill II was equipped with some standard gear but also carried considerable "close-rigged" gear (80 to 82 hooks per line) and "far-away" gear (33 to 34 hooks per line). As the standard gear proved more efficient all the gear was gradually converted to that type.

When the experiment was planned it was expected that the boats would make 2 or 3-day trips to the Funk Island grounds, icing down their catches. However, excellent catches were obtained at the start of the season in 125 to 150 fathoms, 25 to 30 miles east by south of Valleyfield, and from June to mid-September the boats fished this area. From mid-September to October 12, they fished the shoal water (20 to 40 fathoms) inshore grounds, 3 miles northeast of Cabot Island. The following summary shows the fishing effort and financial return.

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 ABSTRACTER: Harold C. Johnson

2.118 DESCRIPTION OF MOST ADVANCED TYPE TUNA VESSEL

Anonymous
Commercial Fisheries Review 18, 33-34 (April 1956)

The Kuroshio Maru No. 21, one of the most advanced tuna vessels in Japan, is now on her fifth trip to the Indian Ocean between Ceylon and Madagascar fishing for yellowfin tuna. Built in 1954, this refrigerated-cargo carrier-type vessel of 1,858 gross tons is powered by a 2,100 h.p. diesel engine and has a speed of 13 knots. The vessel is equipped with radar, loran, echo-sounder, direction finder, and gyrocompass.

The Kuroshio Maru No. 21 carries six small catcher vessels on deck to and from the fishing grounds. In addition, she is equipped with long-line gear which is operated directly from her own deck.

The trip to and from the Indian Ocean takes about 25 days each way, and the vessel fishes for about 30 days, making the total time for each trip about 80 days. Part of the catch is frozen by mechanical-refrigeration equipment, and the remainder is packed in ice for the return voyage. The catch expected from each trip is slightly over 1,000 metric tons. The owners of the ship state that its operations have been "fairly successful."

Upon the ship's return to Japan, the catch is disposed of through normal commercial channels for the fresh-fish trade, freezing, and canning.

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 ABSTRACTER: Kathryn L. Osterhaug

2.15 FISH HANDLING AND HOLD CONSTRUCTION IN CANADIAN NORTH ATLANTIC TRAWLERS

MacCallum, W. A. (Atlantic Fisheries Experimental Station, Halifax, Nova Scotia)
Fisheries Research Board of Canada (Ottawa) (1955) Bulletin No. 103

I. Spoilage and its Control Aboard Ship
   A. The factors contributing to fish spoilage
      (1) Mechanical damage in the trawl, on deck, and in the fish hold
      (2) Heat breakdown of the fish flesh in the trawl, and on deck
      (3) Autolysis or digestion by the gut enzymes
      (4) Bacterial spoilage
   B. Recommended handling procedure for fresh fish
      (1) How fish should be dressed
      (2) Washing
      (3) Preservative dips
      (4) How to move fish below deck
      (5) Icing and stowing the catch

II. Ice and Refrigeration Requirements in Trawler Fish Holds
   A. Fish hold refrigeration requirements
   B. Ice required for a clean environment
   C. Total ice requirements
   D. Present-day icing practice and ice consumption aboard fishing boats
      (1) Summary of estimated requirements for Canadian East coast trawlers

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NYLON VS MANILA TRAWLS

JAPANESE TUNA VESSEL

LONGLINING EXPERIMENTS

FISH HANDLING ABOARD SHIP

2.118 (Cross Reference: 1.1)

Kuroshio Maru No. 21, Japan's most advanced type of tuna vessel.

2.15 (Cross Reference: 2.114)

(2) Actual practice in Great Britain and Germany
(3) Actual practice in Denmark
(4) Actual practice on Canada's East coast

III. The Development of Metal-Surfaced, Wholly Refrigerated Fish Holds
A. The benefits of metal surfaces and of artificial refrigeration
B. Refrigeration applied under the deck vs. wholly refrigerated fish holds
C. Some practical fish hold installations
(1) Fish holds in the schooners Lila B. Boutilier and Theresa E. Connor
(2) Modern wholly refrigerated and metal constructed fresh fish holds in the trawlers Cape Fourchu and Cape Scatari
(3) The unit fish pen--an installation in the fish hold of the trawler Cape Argos

IV. Good Practice in Fish Hold Construction, Outfitting, and Refrigeration
A. A method of ventilating spaces between frames and deck beams
B. Types of protective covering and types and costs of insulation
C. Thickness of insulation
D. Fish hold and pen lining materials
(1) The necessity for watertight material and joints for jacketed fish holds
(2) The influence of metal surfaces on the storage life of fish
(3) Suggested care of wood fish holds and the use of screens to shield fish from wood
(4) Factors to be considered in the selection of metal hold linings and pen components
E. Types and designs of fish pens and variations in fittings
F. Artificial refrigeration equipment

V. Fish Room Costs

2.1121

the difference of pressure between the head line and the ground rope. The normal manometer recorded the pressure at the level of the head line. It served to estimate the fishing depth of the mid water trawl.

Finally a Larsen angle measurer permitted an appreciation to be made of the angle of the warp with the horizontal. Knowing this angle and the length of warp let out, one can obtain from a table the depth of evolution of the boards.

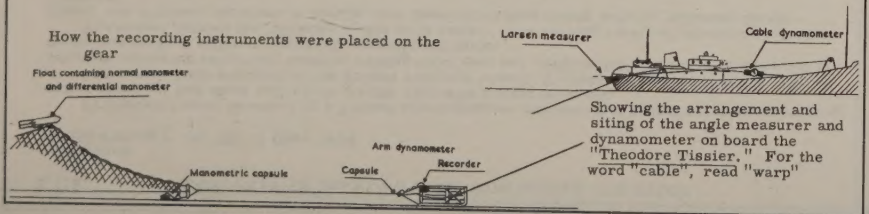
Results. --The tests were carried out in October on the Silver Pits bank where the bottom depths are from 36 to 42 fathoms.

The following figures were taken from the warp dynamometer which records the pull on one warp only:

Herring trawl, nylon, at 140 r.p.m.	2,100 kg.
Herring trawl, manila, at 140 r.p.m.	2,350 kg.
Whiting trawl, nylon, at 140 r.p.m.	2,650 kg.
Whiting trawl, manila, at 140 r.p.m.	3,000 kg.

Resistance of nylon nets is 15 to 20 percent less than that of the same nets made of manila which permits either a gain in speed or a reduction in fuel consumption.

How the recording instruments were placed on the gear



Showing the arrangement and siting of the angle measurer and dynamometer on board the "Theodore Tissier." For the word "cable", read "warp"

2.12 (Cross Reference: 1.0111)

	Ada and Bill II	Gertrude and Ronald
Period of fishing	June 9 - Oct. 12	June 1 - Oct. 12
Total catch cod (lb.)	573,163	835,988
Total tubs gear fished	397	482
Average catch per tub gear	1,444	1,734
Gross stock	$11,462	$16,720
Boats share	2,292	4,180
Expenses	3,271	3,691
Share per man	1,475	2,212

The great variation in catches between the two boats was due in part to the difference in engines performance which allowed the Gertrude and Ronald to make ten more trips than the Ada and Bill II, partly due to the less efficient gear used by the Ada and Bill II, and possibly in part to the greater experience of the captain of the Gertrude and Ronald in fishing deep waters. In spite of the lower catches obtained by Ada and Bill II the shares were well above average for the short period of operation.

With its consistent large catches of good size cod, the experiment was considered very successful, and there is no doubt that extensive offshore and inshore fishing grounds exist within easy reach of Valleyfield. In many years the fishing season could extend from May to late December, the limits in any one year being dependent on ice and weather conditions.

2.12 FWS VESSEL GEORGE M. BOWERS TO SEARCH FOR NEW FISHERIES

Newsome, Hal M.
Southern Fisherman 16, 56-57, 70-78 (February 1956)

The 73-foot vessel, George M. Bowers, that was commissioned at Miami, Florida on January 7, 1956 is the latest addition to the Fish and Wildlife Service's research fleet. Acquisition of this vessel will permit the Branch of Commercial Fisheries to speed up its program of deep-water exploration for new fishery resources and to continue its gear development experiments.

The vessel, equipped with the latest marine-electronic instruments and 3,000 feet of cable, which will allow the scientists to work offshore in depths to 250 fathoms, was scheduled to spend the first three months of 1956 in exploring for new or extended shrimp beds off the coasts of the Carolinas, Georgia, and Florida. Close attention will also be given to the discovery of new finfish resources in the same area.

The 5,000-mile range of the new laboratory vessel, plus her ability to work for extended periods in deep water, will permit the systematic completion of the partial and spotty exploration already done along the South Atlantic Coast. The planned extension of these explorations will give the Fish and Wildlife Service a complete picture of resources in this important area.

After March 31, extensive research will be continued on gear development and improved commercial fishing methods in the Southeastern area.

The Bowers was planned for low-cost operation in varied experimental projects, such as trawling, seining, trolling, gill-netting, long-lining, live bait fishing, and for underwater TV and sound research

(over)

 ABSTRACTER: Kathryn L. Osterhaug

2.9 SEAFOOD'S BEST SALES POINT IS NUTRITION

Kerr, Rose G. (Fish and Wildlife Service, College Park, Maryland)
Frosted Food Field 22, 25, 35 (April 1956)

Fish and shellfish offer proteins, minerals and vitamins which are essential to the maintenance and well being of the human body. In addition to the nutritive value of seafoods, fish is economical, easy to prepare, and, because of developments in quick freezing techniques, available in all areas.

In general, fish and shellfish are excellent sources of animal proteins, the substance that replaces worn out body tissue and promotes growth. One serving of seafood will furnish the animal protein necessary to supplement the less efficient cereal and vegetable proteins in the daily diet. Studies have shown that the proteins of fishery products compare favorably with those of beef, milk and eggs. It has been found that ordinary home cooking methods do not decrease the nutritive value of fish proteins. In addition the protein is 85 to 95 percent digestible.

Seafoods also rate high in mineral content. Iron, magnesium, iodine, calcium, and phosphorus are found in fish. Fats, which are also necessary to health, are found in varying amounts in fish. Very lean fish may contain only 0.5 percent fat while fat fish may reach 20 percent.

Seafoods are adaptable to nearly every type of diet; the invalid's diet, those on a reducing diet, those wishing to gain weight, and of course, the normal diet.

Lean seafoods prepared without fat--broiled, boiled, poached or baked--are valuable in giving variety and needed food value in a reducing diet. When seafoods of any kind are prepared with fat or served with rich sauces they are useful in a weight gaining diet. Seafoods are generally allowed on a

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 ABSTRACTER: Lois Elgin

2.[illegible] PLANT INSPECTION IN MARITIMES

Anonymous
Trade News 8, 21 (April 1956) (Department of Fisheries, Ottawa, Canada)

Uniform minimum standards for plants producing fish and shellfish products have been set by the Department of Fisheries of Canada and a voluntary programme of plant inspection is being instituted in Nova Scotia, New Brunswick and Prince Edward Island, effective May 1.

The minimum standards for plant construction, equipment and sanitation were reviewed by members of the Maritime fishing industry during meetings with Departmental officials in Halifax, N. S., and Moncton, N. B., in March. Agreement was reached during these meetings to enable the introduction of the minimum standards on a voluntary basis.

The minimum standards were drawn up by the technical branch of the Department's Inspection and Consumer Service following intensive research and investigation. In 1954, in co-operation with the fishing industry, the Department completed a coast-to-coast survey of more than 500 fresh, frozen, salt and pickled fish plants which handle fish for inter-provincial and international trade. The data collected during this survey was used as a basis in establishing the minimum plant standards.

A federal-provincial meeting was held in Ottawa shortly following the survey, and the views of the ten provinces were expressed. General agreement was reached at that time on co-operative measures to bring about more effective inspection not only of fish products but also of fish plants and procedures.

The setting of the minimum standards of construction, equipment and sanitation of fish and shellfish plants is a further step in the advancement of the Department's overall inspection programme

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3.12 ANTIBIOTICS FOR WHALE PRESERVATION

Tarr, H. L. A.; Crean, P. B.; and Barker, R. B.
Western Fisheries 51, 32, 34, 58 (April 1956)

Studies were made to determine whether the antibiotic chlortetracycline (CTC) would effectively retard the bacterial spoilage of whale carcasses during the interval between death and processing. The CTC solutions were placed in a 5-gallon galvanized steel tank, which was placed in parallel with the compressed air hose that connects with the hollow spear through which air is injected into the peritoneal cavities of whales after death to create buoyancy. The CTC solutions were introduced through four 1/4-inch holes, which were bored above the spearhead, and were injected at each end of the peritoneal cavity. Commercial preparation containing 10 percent CTC hydrochloride (Aureomycin hydrochloride) was used, unless otherwise stated.

The treated and untreated whales were compared, and the results are as follows:

Whale 1.--A solution containing 55 grams of CTC in ten gallons of water was injected into a 44-foot male sperm whale 1 1/2 hours after death. When the whale was processed 48 hours after capture, the general appearance of the whale was good, there was negligible distension of the abdominal cavity, and only a slight lifting of the flipper. The meat had only a slightly sour odor, and only a portion of it floated as a result of gas spoilage. The oil produced had a free fatty acid (FFA) content of 0.7 percent.

Whale 2.--An untreated 44-foot male sperm whale was examined 43 hours after capture. In contrast to whale 1, whale 2 had a marked abdominal distension and a gas-filled visceral cavity, which burst during flensing. The meat had a very marked sour odor, and the extracted oil had a FFA

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 ABSTRACTER: David T. Miyauchi

NEW RESEARCH VESSEL

FISH PLANT INSPECTION

NUTRITIONAL VALUE OF FISH

ANTIBIOTICS FOR WHALES

2.3 (Cross Reference: 9.3)

which is designed to maintain peak quality from the time the fish are caught until they reach the consumer.

2.12 (Cross Reference: 2.117)

applied to commercial fishing problems.

The boat is basically of shrimp trawler design, but with something of the look of a Pacific Coast combined trawler and seiner. The deckhouse is well forward with a larger than usual deck space aft. Machinery and tanks are located further aft than in most Florida trawlers to give her better trim and seaworthiness.

The craft runs up to 92 gross tons. The beam is 21 1/2 feet and the draft 7 1/2 feet.

3.12 (Cross Reference: 1.95)

content of 2.1 percent.

Whale 3.--A solution of 55 grams of CTC in 10 gallons of water was injected into a 50-foot male sperm whale 3 hours after death. At 43 hours after death, the condition was similar to whale 1.

Whale 4.--A 33-foot male humpback whale was (1) shot with a harpoon containing a linen bag holding 25 grams of pure CTC hydrochloride and packed into the bomb head above the usual charge of black powder; (2) injected with 55 grams of CTC in 10 gallons of water shortly after death. At 26 hours after death, there was no evidence of gas in the peritoneal cavity; the meat had a bright lustre and no detectable off-odor. Examination of the linen, which contained the CTC, showed that about 1/10 of the originally placed CTC still adhered to the cloth, and no visible charring occurred, indicating that CTC may be introduced in this manner without serious loss.

Whale 5.--An untreated 41-foot female humpback whale about 26 hours after death showed a green discolorization on the under surface of the blubber. The meat floated in the washing tanks as a result of gas spoilage, and parts showed a dirty green discoloration.

The results of these preliminary experiments are extremely promising. Additional experiments are anticipated to determine the influence of such factors as larger volumes of CTC solutions, higher concentrations of CTC where the whales may be kept for 2 days or more post mortem, and the introduction of dispersing agents.

2.9 (Cross Reference: 2.8)

low-cholesterol diet when served without eggs, butter or cream.

Seafoods offer variety to meals. There are so many varieties of fish and shellfish and different recipes to prepare them that the homemaker need never despair of menu monotony.

When compared pound for pound with other foods of equal food value, many species of fish and shellfish are found to be very economical. Since frozen seafoods have eliminated the seasonal aspect of serving fish and shellfish, there are many more species available for every food budget.

Seafoods can be served with confidence and pride as they are nutritious, lend variety, are economical, easy to prepare and attractive to serve.

3.14 SODIUM NITRITE AS PRESERVATIVE FOR HERRING. FEEDING EXPERIMENTS WITH HERRING MEAL FROM PRESERVED HERRING AND INVESTIGATIONS ON THE EFFECT OF SODIUM NITRITE IN FARM ANIMALS

Heen, Eirik (Director of Fisheries)
Reports on Technological Research concerning Norwegian Fish Industry 3, No. 4, 96 pp. (1955)

Sodium nitrite ($NaNO_2$) is a very satisfactory preservative for use during the temporary storage of fresh herring that are awaiting processing into meal and oil. The amount of preservation used, however, must not exceed 200 p. p. m. in the finished herring meal just before it leaves the meal plant. In storage, the $NaNO_2$ content of the herring meal continues to diminish so that the level at the time the meal is fed usually does not exceed 100 p. p. m. Extended feeding experiments were carried out to verify that 200 p. p. m. of $NaNO_2$ in herring meal is not harmful to animals.

Toxicological experiments at the Veterinary College of Norway showed a temporary increase of methemoglobin in the blood of cattle and sheep when $NaNO_2$ dissolved in water was fed in doses of 12.5 to 25 milligrams (mgs.) per kilogram (kg.) of body weight.

Clinical symptoms of nitrite poisoning appeared when the dosage reached 60 mgs. per kg. of body weight, at which level 20 to 25 percent of the hemoglobin was present as methemoglobin. Clinical symptoms were produced in pigs by feeding 40 to 50 mgs. of nitrite per kg. of body weight. The lethal dose was 90 to 100 mgs. per kg. body weight for cattle and sheep and 70 to 75 mgs. for pigs. At these levels the methemoglobin level of the blood was about 80 percent. Herring meal containing 20 p. p. m. of $NaNO_2$ even when fed in liberal amounts provides no more than 0.5 to 1 mg. of $NaNO_2$ per kg. of body weight, which is 1/50 to 1/100 of the amount needed to produce clinical symptoms.

(over)

 ABSTRACTER: Martin Heerdt

3.237 WELL-DESIGNED PRODUCTION LINE SPREADS OUTPUT, CUTS LABOR

Anonymous
Quick Frozen Foods 18, 53, 184 (May 1956)

A well-designed production line, with several special pieces of equipment and only 10 work stations, enables a Seattle, Washington firm to produce 500 cases of frozen fish sticks in a single eight-hour shift.

The $80,000 plant, the only one of its kind in the state, packs fish sticks for nine different labels.

Their latest product is an oyster stick, packed for a Shelton, Washington firm. The oysters arrive at the Seattle plant in 18 1/2 pound blocks. In the production of these blocks, the oysters are first spun dry and then diced and breaded.

For stick production, the 11 x 14 x 3 1/2 inch oyster blocks are stripped on a bandsaw into slabs 3 1/2 x 3/4 x 14 inches. The slabs go directly into a hydraulic webber where they are sawed into 3 1/2 x 3/4 x 1/2 inch sticks. The sticks fall directly on a conveyor belt that carries them through a batch of batter. The batter falls upon the sticks from a perforated overhead pipe. Surplus batter is automatically strained and re-circulated.

The batter-covered sticks are dusted with a shower of breading from which all lumps have been removed by a revolving screen. The shower of breading falls on the conveyor just ahead of the sticks so that breading is picked from below as well as from above.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

3.236 BREADED SEAFOOD QUALITY, UNIFORMITY ARE VITAL FACTORS IN RESTAURANT SALES

Casperson, L. O. (O. Casperson & Sons, San Francisco, California)
Frosted Food Field 22, 23 (April 1956)

There is a definite place for both breaded and raw fish items in the institutional field. However, a word of caution about quality is in order. Breading a poor quality product will certainly not improve its quality. Too much breading to fit a price will not bring repeat orders.

The restaurant operator is definitely interested in any item which gives him controlled portion costs. Breaded fish items properly prepared are in this category. It presents an opportunity for increased use of fish, for fish is a delectable entree when tastefully prepared and served.

Repeat business is the secret of success in any business and particularly so in the food field which depends so much on volume with fast turnover and small profits.

The restaurant operator is looking for new items to give variety to his menus, but he is interested only in items that will bring repeat business. The same holds good for the distributor; he cannot afford to introduce products without a reasonable prospect of repeat orders to offset today's high cost of selling and pioneering of new items.

Certainly the packer and processor can find no sounder foundation on which to build his business than that of uniform quality based on fair pricing.

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3.238 THERMOFORMING HAS ARRIVED

Anonymous
Modern Packaging 29, 95-105, 231-232 (May 1956)

The all-plastic thermoformed container is coming to the fore. In purpose and performance it is like the folding carton, but it will do some of the jobs that jars and cans perform. Big uses are anticipated for thermoforms packaging products such as tomatoes, eggs and frozen foods.

The first package of this type to be seen in the frozen-food field is the polyethylene container used by an Alaskan firm to freeze cod fillets. This container consists of a ribbed (for rigidity) tray. The cover is heat-sealed polyethylene-cellophane film. The fillets are frozen in the container. Polyethylene is well adapted to sub-zero conditions.

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 ABSTRACTER: Kathryn L. Osterhaug

$NaNO_2$ IN MEALS

QUALITY OF BREADED FISH

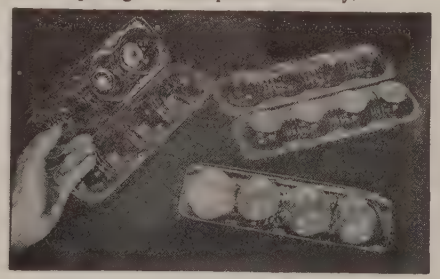
FISH AND OYSTER STICKS

THERMOFORMED PACKAGES

3.236

3.238

INTRIGUING in both appearance and low cost are these ultra-thin acetate sheet hinged trays for tomatoes and other produce items. It is said to be the first practical, low-cost package with 100 percent visibility.



FIRST IN FROZEN FOODS is this thermoformed polyethylene container with printed polyethylene-cellophane film cover.

3.14 (Cross Reference: 6.190)

The combined facilities of the Agricultural College of Norway and the agricultural schools at Tomb and Kalnes were used in 1951-53 to carry out 6 feeding trials with a total of 136 dairy cows. In each trial the control group of cows received $NaNO_2$ free herring meal, whereas the test group received herring meals made from $NaNO_2$ preserved herring and containing from 130 to 2,100 p.p.m. of $NaNO_2$. Herring meal at an average intake of 0.9 kg. per cow per day was the only protein concentrate used in the rations. These cows did not show any change in health. The milk yield from the control and test groups was very similar. During the winter of 1952-53, herring meals containing up to 200 p.p.m. of $NaNO_2$ when marketed were fed to 504 dairy cows and 163 head of young stock on a total of 17 farms in quantities of 0.3 to 1.5 kg. per cow per day for periods of 100 to 180 days. Both milk yield and animal health remained normal on these $NaNO_2$ containing rations. During 1952-53 herring meal containing no $NaNO_2$ and 360 p.p.m. of $NaNO_2$ at delivery from the factory was fed respectively, to control and test groups of 11 ewes each, in amounts of 100 to 300 grams per head per day without deleterious effect or significant differences in the weight of the ewes, their lambs, and their wool yield.

In one experiment at the Agricultural College of Norway, herring meal containing no $NaNO_2$ and 4,150 p.p.m. of nitrite at delivery from the factory was fed, respectively, to control and test groups of pigs. $NaNO_2$ intakes of the test animals averaged from 1,000 to 1,080 mgs. daily or about 20 mgs. per kg. of body weight. Two other test groups of pigs also ingested $NaNO_2$ at the same high level. The pigs, however, received their $NaNO_2$ dissolved in water or mixed dry with fresh herring meal. Growth and health were unaffected in all groups although blood analyses showed traces of methemoglobin.

Growth and health of chicks receiving meals containing less than 200 p.p.m. of $NaNO_2$ was normal. Pure $NaNO_2$ added at levels of 5,000 p.p.m. in the herring meal with 10 percent of this meal in the chick ration or 500 p.p.m. of $NaNO_2$ in the ration was detrimental to chicks due to destruction of the vitamin A in the ration.

3.237 (Cross Reference: 1.81)

The breaded sticks fall upon a vibrator screen that removes excess breading after which they go through a second batter and breading operation. They are then fed automatically into a deep fat fryer.

Up to this point the production line has required only three workers--one man on the saw and webber, another on the breaders, and a woman to separate the sticks as they come from the second breader.

The 20 foot stainless steel gas fryer processes 1,500 pounds of frozen sticks an hour. An 18-foot atmospheric gas-fired pilot burner with a stainless steel ignition rail is lighted by electric ignition. Full floating control of the heat, besides providing close temperature tolerances, prevents overheating of the fat and makes it possible to use the hydrogenated frying oil for some 5,000 cases of sticks before need for a change. The oil is heated to 385° F.

After a 40-second trip through the fryer, the sticks enter a cooling tunnel where they are cooled to 70° F. by filtered air circulating at a rate of 5,000 cfm.

The cooled sticks are hand packed into 8 and 10 ounce waxed cartons. The cartons are closed and overwrapped by machine, cased 12 cartons to a case and frozen in a blast freezer at -50° F.

Closeup of breading machine

3.26 MICHIGAN LOCKER-PLANT SURVEY

Cabaniss, William I. (Branch of Commercial Fisheries, U. S. Fish and Wildlife Service, Washington, D. C.)
Commercial Fisheries Review 18, 6-8 (March 1956)

During the summer and fall of 1953, 163 Michigan locker plant operators were interviewed by a fishery marketing specialist of the Fish and Wildlife Service. The following questions were asked each locker plant operator:

1. Are fishery products being sold in the plant?
2. What is the monthly volume of sales?
3. What varieties are handled?
4. How many lockers are rented in the plant?
5. What kind of advertising is being done with regard to fishery products?

The survey revealed that 129 out of the 163 locker plants contacted were handling fishery products. Both wholesale and retail sales were being made by 24 of the plants; the remainder sold to the retail trade only. Less than half of the operators interviewed were selling fish to their regular locker-plant customers.

Only 40 of the plants surveyed were selling 100 pounds or more of fish and shellfish each month. The average monthly quantity of fish and shellfish sold by the 24 plants catering to both the wholesale and retail trade was 258 pounds as compared to 60 pounds a month for the 105 plants selling to the retail trade only.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

3.4 ELECTROSTATIC SMOKING IS DESCRIBED

Brockmann, M. P. (Kingan, Inc., Indianapolis)
The National Provisioner 133, 119 (November 26, 1955)

Smoking performs three basic functions: smoking, heating, and drying. Although smoking does have some preservative value, the meat packer is primarily concerned with the enhancement of flavor and appearance imparted by the smoking operation.

The batch type of smoke house is time-consuming, lacks flexibility, and is not economical. The answer to these objections is the continuous electrostatic smoking process.

In the smoke house developed by Dr. Brockmann, smoke from the generator enters through a smoke duct at the bottom of the smoking chamber. As the smoke rises it passes between the ionizer plates and the ionizing wires. The plates are of stainless steel 36 x 36 inches hung from rods above. By sliding these plates along the rods they can be adjusted to the proper distance from the product. Attached to the plates and mounted 3 inches from the plate surface are the ionizing wires. These wires are of tungsten .007 in diameter and mounted parallel 3 inches apart and vertical from top to bottom of the plates. The product is carried between these plates on combs or wire racks hung from the overhead cable conveyor. The distance of the plates from the product is important as the product must be kept at ground potential and the ionizers just far enough away from the product to prevent the development of a spark. The function of the steel plates is to channel the smoke between them and to carry the ionizing wires. Potential on the ionizers ranges from 25,000 volts to 35,000 volts.

Smoke deposition depends upon several factors such as voltage, density of smoke, distance of ionizers from the product and time or speed of the conveyor through the smoke chamber. Smoke

(over)

 ABSTRACTER: Lynne G. McKee

3.4 RECORDING SMOKEMETER FOR FISH AND BACON CURERS

Jason, A. C. (Torry Research Station, Aberdeen, Scotland)
Food Manufacture 31, 112-113 (March 1956)

While conducting experiments concerned with the smoke curing of fish, the author found a need for measuring and controlling the density of the wood smoke used. To fill this need a smokemeter was constructed. The bases for its construction were the principles expressed in the following three equations.

The optical density of a substance that absorbs light is expressed as $D=\log_{10}(I_o/I)$ in which I_o/I is the ratio of the intensities of the incident light to the transmitted light. Many smokes obey Beer's law by which optical density is related to mass density d of the smoke particles in a given volume by the expression $D=a.d$ where a is a constant for a given type of smoke. These facts justify the expression of "smoke density" S in terms of optical density in the following way: $S=\frac{1}{L}\log_{10}(I_o/I)=\frac{D}{L}$ in which L is the length of the light path in the smoke. S is then expressed in terms of optical density per unit length and is independent of the dimensions of the measurement apparatus.

Figure 1, over, shows the schematic arrangement of the recording smokemeter, whereas figure 2, over, shows front and rear views of the actual instrument. Light that passes through the smoke is absorbed by a narrow portion of an annular optical wedge which moves in front of the aperature. As the smoke density increases the total optical density is adjusted to a constant value. This adjustment is accomplished by rotating the optical wedge until the light that falls onto a barrier-layer photocell is equal to the light which passes through a sealed reference column on a similar cell. The density of the smoke is indicated directly by the degree of rotation of the optical wedge at the point of balance.

In the recording instrument shown, the position of the optical wedge is adjusted automatically and continuously with any variation in smoke density. Any difference in potential between the two photocells connected in opposition is fed into an amplifier controlling the speed and direction or rotation of a

(over)

 ABSTRACTER: Martin Heerdt

3.5 CHEMICAL ASPECTS OF THE SALTING OF CODFISH

Soudan, F.
Rev. Trav. Inst. sci. tech. Peches marit., Paris 19, 129-306 (1955)
Food Science Abstracts 27, 616 (November 1955)

Work on the physical and chemical factors affecting exchanges of water and salt in the salting of fish, and on the spoilage of salted fish, is summarized. The yellowing of salted fish is then considered in detail. This occurs first and most extensively in the outer layers of the fish, and is favoured by residues of blood and visceral tissues, by salting too soon or too long after death, by excess of salt, or by the use of pure finely-divided salt. The author's investigations showed that the yellowing is probably the result of a Maillard type of reaction between compounds formed in the oxidation of fats (peroxides and/or aldehydes with adjacent carbonyl and hydroxyl groups), and proteins or amino acids. Solvents extract the brown product from the tissues with the fats. The oxidation of tissue fat is favoured by the presence of trimethylamine oxide, which is converted to trimethylamine by bacteria fairly soon after death; yellowing is thus favoured if the flesh is salted and the bacteria inhibited while trimethylamine oxide is still present. Another factor favouring the yellowing reaction in the outer layers of the flesh is the loss of natural anti-oxidants (phosphatides) in the exudate formed on salting, leading to increased oxidation of the fat. Very pure fine salt favours yellowing because it passes rapidly into the tissues and checks metabolism at a stage favourable to the oxidation of the fat. Impurities of a colloidal nature in the salt (clay, etc.) may cover the surfaces of the tissues, and prevent yellowing by delaying absorption of salt. Moderate amounts of calcium and magnesium, as sulphates, tend to prevent absorption of salt, and inhibit yellowing; excess of calcium favours yellowing, perhaps owing to precipitation of phosphate as tricalcium phosphate, with loss of buffering power. Magnesium chloride penetrates the muscle more rapidly than sodium chloride, and favours yellowing. Salt of the most satisfactory composition contains 0.15 to 0.35 percent of calcium and 0.05 to 0.15 percent of

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3.4 (Cross Reference: 0.118, 0.12)

servo-motor. The servo-motor rotates the annular optical wedge in whatever direction is required to reduce the potential difference to zero and in so doing maintains constant attenuation of light in the smoke path. A continuous record of the smoke density is provided by a pen-arm that is coupled to the servo-motor and carries a stylus across a moving chart. The end windows that define the smoke path are heated with an electric current passing through a transparent conducting layer deposited on their surfaces to prevent smoke from being deposited on them. The chart is calibrated in direct proportion to the optical density within the limits of accuracy of the annular optical wedge.

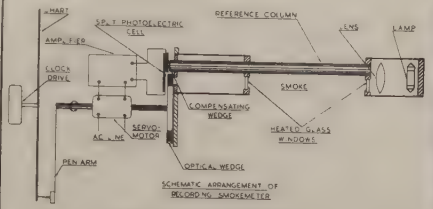

Fig. 1 Schematic arrangement of the recording smokemeter.

Fig. 2 General views of front and rear of smokemeter, which may be mounted on the wall of a smoking kiln or duct.

3.5

magnesium, mostly as sulphate, with a molecular calcium: magnesium ratio of 1.5 to 3.0. Too long a delay before salting allows breakdown of protein and favours yellowing, and high temperatures favour yellowing by hastening both breakdown of protein and oxidation of fat.

3.26

Locker plant offering over 5 varieties of fish and shellfish for sale sold an average of 190 pounds of fishery products a month as compared to an average of 51 pounds a month for locker plants offering two or three varieties only.

Other factors strongly influencing locker plant fish sales were found to be proper display of the product, the use of attractive point-of-sale fish signs and the effort and enthusiasm of the locker-plant operator. The ideal location for the frozen food cabinet in which the fish is displayed is near the entrance where customers normally enter.

A Lansing (Mich.) locker plant's frozen-food display case in which frozen scallops and ocean perch fillets are displayed.

3.4

density is checked by a smoke density meter actuated by a bolometer and light source located in the smoke duct. With all variables adjusted to the optimum point a bacon side can be smoked in 2 1/2 minutes.

Unless the product is to be canned, the appearance of the smoked surface is a factor. To stabilize the smoke and improve appearance, an infra red lamp heating chamber is incorporated with the smoking unit. The inner walls of the heating unit are of polished aluminum plates to act as reflectors for the infra red lamps.

In processing hams, a conveyor speed of 2 1/2 to 3 feet per minute gives the desired results. The added heat of the infra red lamps does not raise the inner temperature of the hams more than five degrees F. and weight loss to not more than .05 percent. The electrostatic principle of smoking has the great advantage of doing the job quickly and at such a low temperature that there is little chance for the growth of micro-organisms. Deterioration due to oxidation is also minimized.

The unit for the continuous production of bacon by electrostatic smoking and infra red heating consists of five heating sections preceding the smoking chamber and one heating section following the smoking to stabilize the deposited smoke. Capacity per hour of bacon sides is 1,400 to 1,500 pounds per hour for all sizes up to 18 pounds. The average weight loss is .07 percent. Conveyor speed varies from 1.4 feet per minute to 2.6 feet depending upon the size of sides being smoked.

The smoked sides, after passing through the heating and smoking process, return to the loading station and one operator cares for the loading and unloading.

Flavor of sliced bacon prepared by the electrostatic method is indistinguishable from sliced bacon prepared by the old process. Handling costs are reduced 50 percent.

The continuous system is quite flexible and does not require a fixed load to operate efficiently as does the batch type smoke house. Capital costs are less. Fat dripping from the sides prior to entering the smoking chamber is recoverable as edible fat. A greater range of flavors is possible by varying the rate of smoke deposition. Since the time is shorter it is bacteriologically feasible to use less salt. From a dietetic standpoint this is of increasing importance.

3.63 FACTORS AFFECTING THE RATE OF CHICKEN MEAT DEHYDRATION UNDER VACUUM

Yao, Alden; Nelson, A. I.; and Steinberg, M. P. (University of Illinois, Urbana)
Food Technology 10, 145-150 (March 1956)

Serving-size pieces of 3-month-old broiler chicken muscle were precooked for 15 minutes in boiling water and then dehydrated in a vacuum plate dryer with and without freeze drying.

Tray temperatures.--In studies made to determine acceptable drying procedures, tray temperatures were found to markedly affect the drying rate. Increasing the tray temperature to 145° F. increased the drying rate (figure 1, over). The most desirable tray temperature from the standpoint of product quality and acceptable drying rate was 130° F.

Dryer pressure studies.--The drying rate was also influenced to a marked degree by the pressure in the dryer (figure 3, over). Rapid drying rates with no visible case hardening resulted from drying at a pressure at or below 1 millimeter of mercury and a tray temperature of 130° F. Seven hours was adequate to dry pieces of chicken to less than 5 percent moisture under these conditions.

Product temperatures.--Better drying rates were obtained with an initial product temperature of 0° F. than with a higher initial product temperature or a product temperature of -40° F.

Mode of heat transfer.--The mode of heat transfer to the chicken pieces was predominately by means of radiation. Increasing the rate of heat transfer by conduction noticeably increased the rate of drying. Opportunities for increasing the rate of drying are to be found primarily in improvements in heat transfer by conduction.

Other factors.--Precooking, initial moisture content, and sample thickness within the limits studied did not have a marked effect on the drying rate. Low drier temperatures including freeze drying did not offer any apparent product quality advantage over drying at 130° F. according to statistical analyses of organoleptic and rehydration data. The dehydrated chicken obtained from drying at 130° F.

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 ABSTRACTER: Martin Heerdt

4.13 THE LIPIDS OF FISH
7. PHOSPHATE ESTERS IN THE LIPIDS OF HADDOCK AND COD FLESH

Olley, June (Torry Research Station, Aberdeen, Scotland)
The Biochemical Journal 62, 107-114 (January 1956)

Phospholipid fractions from haddock and cod muscle, containing appreciable quantities of unidentified lipids, were hydrolysed with 0.5N-KOH in 95 percent ethanol for 2 hours under reflux. Potassium salts of phosphate esters from these hydrolysates were fractionated on the basis of their solubility in ethanol, by paper chromatography, by stability to hydrolysis at pH 4 for 7 hours in an autoclave at 15 lb. pressure and by stability to hydrolysis at pH 4 after a preliminary hydrolysis with N-HCl.

These methods showed the presence of a series of phosphate esters based on glycerol and small quantities of phosphoric acid in some other combination.

A micro-chromatographic method for the estimation of glycerol has been developed, whereby the amounts of glycerol and phosphoric acid liberated under different conditions of hydrolysis could be correlated. Phosphate esters with more than one glycerol residue per atom of phosphorus were found in the ethanol-soluble fractions, giving evidence of bis-phosphatidic acid-type structures. These could be divided into two classes according to stability at pH 4.

The method of acid-periodate oxidation has been found completely unspecific for glycero-phosphate esters. In some fractions acid-periodate oxidation liberated more phosphoric acid than was formed by hydrolysis at pH 4, which is known to yield quantitative hydrolysis of glycerophosphoric acid. In other fractions, hydrolysed with N-HCl and then at pH 4, the glycerol and phosphoric acid liberated were more than could be accounted for by the results obtained from acid-periodate oxidation.

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 Author's Summary

4.11 APPLICATION OF INFRARED SPECTROPHOTOMETRY TO FATTY ACID DERIVATIVES

O'Connor, Robert T. (Southern Regional Research Laboratory, New Orleans, Louisiana)
The Journal of the American Oil Chemist's Society 33, 1-15 (January 1956)

The author gives a survey of published technical articles about infrared spectra of fatty acid materials. A table is given on one hundred absorption bands employed in the applications of infrared spectroscopy to fatty acid chemistry. The table shows the wavelength in microns of the observed absorption bands and the vibrating groups that give rise to the observed absorption bands.

Applications of I. R. spectral data to cis-trans-isomerization studies is reviewed. The most useful application of infrared spectra to fatty acid materials thus far developed has been a method to distinguish between cis and trans unsaturation and to determine trans bands in the presence of cis bands. The use of cis-trans I. R. data in studies of hydrogenation and oxidation are discussed. Similarly, infrared spectra is used in studies of autoxidation and rancidity. This discussion includes interpretation of I. R. data with respect to mechanism of oxidations, hydroperoxide formation, various band stretchings, etc.

Other applications that are discussed are in connection with drying oils, glycerides, oil-styrene copolymers, and lipides and phospholipides. Elucidation of molecular structure by the use of I. R. spectra as applied to fatty acid materials is briefly reviewed. Several miscellaneous applications are discussed, for example the characterization of fatty acid anhydrides, the confirmed analysis and determination of isomeric structure of pure methyl isolanolenate, a study leading to a suggested method for determining the position of double bands, and hydroxyl values by I. R. method.

(over)

 ABSTRACTER: Edward H. Gruger

4.19 CONSTITUENT FATTY ACIDS OF SALMON EGG FAT

Kyte, R. M. (Fishery Products Laboratory, Ketchikan, Alaska)
The Journal of the American Oil Chemists' Society 33, 146-149 (April 1956)

Fat separated from pink salmon (O. gorbuscha) eggs by a warm 4 percent NaCl solution accounted for approximately 1/3 of the total lipid of the salmon egg. The constituent fatty acids of this oil were determined by the conventional Hilditch method (The Chemical Constitution of Natural Fats, Ch. XI, John Wiley and Sons, Inc., New York, (1941)) which is essentially (a) a preliminary separation of the fatty acids into saturated and unsaturated fractions, (b) vacuum distillation of the methyl esters of these fractions into subfractions, (c) determination of iodine value and saponification equivalent of each of the subfractions from the vacuum distillation, and (d) calculation of the constituent fatty acids from these data. The results of the determination are shown in Table II with, for comparison, the constituent fatty acids reported by Lovern (Biochem. J. 30, 21 (1936)) in the fat from eggs of Atlantic salmon (Salmo salar).

Using a recent correlation published by Hammond and Lundberg (J. Am. Oil Chemists' Soc., 31, 427-432 (1954)) of refractive index, carbon chain length, and unsaturation it was shown that significant alteration of the unsaturated fraction occurred during the vacuum distillation step in the analysis. Because of this alteration, the fatty acids in salmon egg oil are actually more unsaturated and of longer chain length than determined by the Hilditch method of analysis.

(over)

 ABSTRACTER: Robert M. Kyte

4.11

One hundred twenty-seven references to technical literature on infrared spectroscopy applications are given.

4.19

TABLE II

Distribution of Constituent Fatty Acids in Certain Salmon Egg Fats

Fatty acids	Distribution		
	O. gorbuscha	S. salar[a]	
	Maturity 2.5[b]	Maturity 2[c]	Maturity 4[c]
	%	%	%
C_{14} saturate	1.8	2.9	1.8
C_{14} monolefin	0.1	0.4	---
C_{16} saturate	8.3	13.4	13.0
C_{16} monolefin	5.1	10.4	9.9
C_{18} saturate	1.9	0.7	2.0
C_{18} unsaturate	31.3 (3.6)[d]	25.3 (3.2)[d]	36.7 (2.9)[d]
C_{20} unsaturate	31.1 (7.3)[d]	28.7 (7.2)[d]	21.3 (7.6)[d]
C_{22} unsaturate	14.7 (11.8)[d]	18.1 (11.4)[d]	15.3 (11.1)[d]
C_{24} unsaturate	0.2	---	---
Unresolved	5.5	0.1	---

a Data by Lovern.
b Maturity on a scale of increasing development from 1 to 4 used by Davidson and Shostrom.
c Maturity on a scale of increasing development from 1 to 5 used by Lovern.
d The numbers in parentheses are a measure of the unsaturation and indicate the number of atoms of hydrogen required to saturate the fatty acid.

3.63

rehydrated satisfactorily and had an organoleptic quality comparable with that of undehydrated controls.

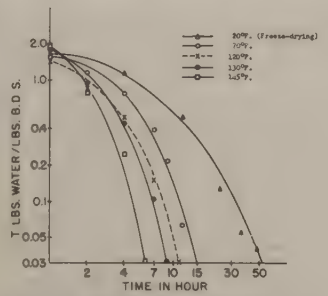

Figure 1. Effect of drier temperature on dehydration of precooked breast muscle having initial temperature of 0° F. with pressure maintained at or below 0.4 mm. Hg.

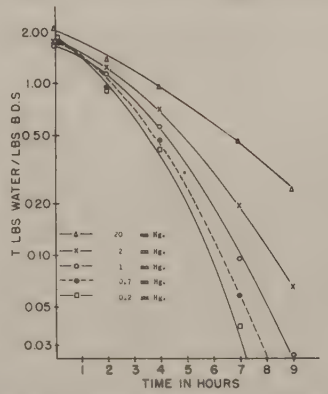

Figure 3. Effect of pressure on the drying rate of precooked leg muscles dehydrated at 130° F.

4.13

The dangers of using even weakly acid ion-exchange resins for the separation of phosphate esters have been discussed.

6.190 THE EFFECT OF CHLOROTETRACYCLINE AND FISH MEAL ON THE GROWTH AND THYROIDS OF CHICKENS

Keeling, A. D., Hill, C. H., Garren, H. W., and Kelly, J. W. (North Carolina State College, Raleigh)
Poultry Science 34, 1453-1454 (November 1955)

Objective.--This is a report of a study made to determine if crystalline chlorotetracycline would affect the weight and histological appearance of the thyroid glands of chicks fed either an all vegetable diet or a diet which contained 5 percent fish meal.

Experimental.--Twenty-four hour old White Plymouth Rock chicks obtained from a commercial hatchery were used. These chicks were raised in electrically heated battery brooders on raised wire floors during extremely warm weather or at a temperature of 90° F. all day. They received a basal diet that consisted of corn, 48.6 percent; soybean oil meal, 47 percent; defluorinated phosphate, 2 percent, limestone, 1.5 percent, methionine, 0.3 percent, vitamin mix, 0.5 percent, salt (not iodized), 0.5 percent; manganous sulfate, 100 milligrams per pound of ration; and choline, 700 milligrams per pound of ration.

Rations that were supplemented with 5 percent fish meal contained proportionately less soybean oil meal in a amount calculated to maintain a level of protein equal to the basal ration.

Each experimental ration was fed ad libitum to two lots of 25 chicks each. Drinking water was available at all times, and chicks were weighed at weekly intervals. When the chicks were 34 days old, 25 chicks from each treatment were selected at random and their thyroid glands were removed and weighed individually to the nearest 0.2 milligram.

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 ABSTRACTER: Martin Heerdt

6.193 FURTHER INFORMATION CONCERNING UNIDENTIFIED CHICK GROWTH FACTORS

Camp, A. A.; Cartrite, H. T.; Quisenberry, J. H.; and Couch, J. R.
Poultry Science 34, 559 (May 1955)

Data have been presented which suggest the presence of one or more unidentified chick growth factors in dried whey, fermented whey, hydrolyzed whey, fish solubles and an antibiotic fermentation residue as the weights of the chicks were significantly increased, at the .01 level of probability, when these supplements were added alone or in combination.

One factor seems to be present in dried whey and fermented whey and another factor appears to be present in fish solubles and the antibiotic fermentation product. Hydrolyzed whey either contains a factor different from the factors found in dried whey and fish solubles or increases the energy in the diet resulting in a significant increase in growth rate when added to a diet containing either fish solubles, dried whey, or fermented whey. Evidence for the existence of these different factors is supported by the fact that a significant increase in growth is produced by a combination of sources of these factors when compared with a source of only one of these factors.

See table, over.

(over)

 Author's summary

6.192 COMPARISON OF SOME SOURCES OF UNIDENTIFIED CHICK GROWTH FACTORS WITH FISH MEAL

Morimoto, H.; Ariyoshi, S.; and Hoshii, H. (National Institute of Health Sciences, Chiba, Japan)
Poultry Science 34, 1392-1395 (November 1955)

Purpose.--The purpose of this investigation was to study (1) autolyzed cuttlefish, autolyzed sardines, and fish solubles and (2) certain microbiological products as sources of the unidentified chick growth factors.

Results.--The results are given in the accompanying table. The basal diet contained 29 percent soybean oil meal, whereas the control diet contained 14.5 percent soybean oil meal and 10 percent sardine meal. Fraction 1 was a water extract of fish meal; fraction 2 the dried residue. The wood yeast was from sulfite pulp waste; the fungi feed from distillers' residue; and the koji feeds, which were cultured from various mold strains, were from starch cake and ammonium sulfide.

Summary.--Autolyzed cuttlefish, autolyzed sardines, and fish solubles, when fed to chicks, produced growth responses that indicated the presence of unidentified growth factors. None of these materials, however, was as potent a source of these growth factors as fish meal.

Fungi feed gave only a slight growth response. Six koji feeds were tested, but only two showed any effect on chick growth. Brewer's yeast and koji feeds a and c were nearly as effective as was fish meal in promoting chick growth. The potency of unidentified chick growth factors in microbiological products is apparently partially dependent upon the type of culture used.

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 ABSTRACTER: F. Bruce Sanford

6.132 METHOD OF HANDLING FISH VISCERA REPORTED

Anonymous
Feedstuffs 28, 43 (May 5, 1956)

According to a report from the Industrial Products Division of the National Fisheries Institute, a new method of handling fish viscera has been developed in Nova Scotia. These viscera formerly were discarded overboard in large quantities by off-shore fishermen.

The new method of handling involves mixing the viscera with a preservative and storing the mixture in large tanks. During the period of storage the viscera are digested and completely hydrolyzed. The moisture content of the hydrolyzed viscera is then reduced by drying until a light colored meal is obtained. This meal is said to be highly palatable and exceptionally high in vitamins.

The new viscera meal is currently being evaluated as a component part of formulated animal and poultry rations.

 ABSTRACTER: Martin Heerdt

FISH MEAL VS. THYROID SIZE

CHICK GROWTH FACTORS

UNIDENTIFIED CHICK GROWTH FACTORS

MEAL FROM HYDROLYZED VISCERA

6.192

UNIDENTIFIED GROWTH FACTORS

Growth responses of chicks to fish products		Growth responses of chicks to microbiological products	
Diet and Supplement	Average gain (gm.)	Diet and Supplement	Average gain (gm.)
Basal	142	Basal	142
Basal + Fraction 1	146	Basal + 5 percent wood yeast	196
Basal + Fraction 2	171	Basal + 10 percent fungi feed	170
Control	226	Control	226
Basal	114	Basal	114
Basal + Fraction 1	135	Basal + 10 percent koji feed (a)	139
Basal + Fraction 2	163	Basal + 10 percent koji feed (b)	116
Control	157	Control	157
Basal	155	Basal	155
Basal + autolyzed sardines (solubles)	152	Basal + 10 percent koji feed (a)	221
Basal + autolyzed sardines (residue)	209	Basal + 4 percent wood yeast	159
Control	211	Basal + 8 percent wood yeast	162
		Basal + 4 percent brewers' yeast	200
		Control	211
Basal	166	Basal	166
Basal + Fish solubles	210	Basal + 10 percent koji feed (c)	198
Basal + Fish residue	193	Basal + 10 percent koji feed (d)	93
Basal + autolyzed cuttle fish	195	Basal + 10 percent koji feed (e)	96
Basal + autolyzed sardines	189	Basal + 10 percent koji feed (f)	176
Control	241	Control	221

6.132 (Cross Reference: 6.7)

6.190 (Cross Reference: 3.14)

Results.--Chick weights and thyroid weights are summarized in table 1, below. Chlorotetracycline had no significant effect on the weight or histological appearance of the thyroids of chicks that received either an all-vegetable ration or an all-vegetable ration supplemented with 5 percent fish meal. Chicks that received the all-vegetable ration had larger and apparent histologically more active thyroid glands than the chicks in the lots that received the ration containing 5 percent fish meal. This difference probably was due to the iodine content of the fish meal, because all chicks received non-iodized salt.

Reasons for the conflicting reports on the effects of antibiotics on thyroid gland size and histological appearance are not apparent. The results of this study clearly show, however, that an increase in the body weight of chicks receiving antibiotics does not depend on a change in the size or histological appearance of the thyroid gland.

Table 1. Summary of the effects of antibiotics and fish meal on body and thyroid weights

	4 wk. wt., gm. ±S.E.	Thyroid wt. Mg./100 gm. body wt. ±S.E.	34 days wt.,[1] gm. ±S.E.
Control	300±6.7	10.4±.53	375±14.5
100 mg. Chlortetracycline/lb.	332±6.9**	9.5±.56	413±10.7*
5 percent Fish Meal	337±5.5**	7.5±.36*	405± 9.7
5 percent Fish Meal + 100 gm. Chlortetracycline/lb.	328±6.4**	8.1±.31*	393±11.6

[1]Body weight of 25 birds used for thyroid study at 34 days of age.
*Significant at 5 percent level.
**Significant at 1 percent level.

6.193

Table 4.
The effect of adding sources of unidentified growth factors to the diet of the chick (Experiment)

Lot No.	Supplement to basal	Av. wt. 10 wks.		Increase over basal		Increase over fish solubles		Increase over dried whey	
		Male	Female	Male	Female	Male	Female	Male	Female
1	None	1,103	936	—	—	—	—	—	—
4	3% Fish Solubles	1,391	1,167	288†	231†	—	—	—	—
7	3% Dried Whey	1,421	1,159	318†	223†	—	—	—	—
8	3% Fish Solubles+3% Dried Whey	1,533	1,228	430†	292†	142†	61†	112†	69†
9	3% Dried Whey+2.5% Antibiotic Fermentation Residue	1,523	1,211	420†	276†	132†	45*	102†	52*
10	3% Dried Whey+3% Fish Solubles+2.5% Antibiotic Fermentation Residue	1,543	1,244	440†	308†	152†	77†	122†	85†
12	3% Dried Whey+3% Fish Solubles+5% Molasses (for milo)	1,519	1,212	416†	276†	128†	45*	98†	53*

Statistical Analysis	*Male*	*Female*
"F" Value‡	2.14	2.14
L.S.D.§ (0.05)	49	45
L.S.D. (0.01)	64	59

* Significant at the .05 level of probability.
† Significant at the .01 level of probability.
‡ Ratio of appropriate mean square values from analysis of variance table.
§ Least significant difference.

7.85 RAPID PROCEDURES FOR APPROXIMATION OF BACTERIAL COUNTS IN SHRIMP AND OYSTERS

Novak, A. F.; Fieger, E. A.; and Bailey, M. E. (Louisiana State University, Baton Rouge, Louisiana) Food Technology 10, 66-67 (February 1956)

Two rapid methods for the approximate determination of the number of bacteria present in shrimp and oysters have been developed by the authors. These methods should also be applicable to other foods.

Acid production method.--Acid production from growth in a carbohydrate-containing medium is used to measure the number of microorganisms present in a sample of shrimp or oysters. The amount of acid produced, which is proportional to the number of bacteria present in the sample, is measured by observing a color change when an indicator is added to the medium.

Reduction method.--The reduction method is a modification of the methylene blue reductase test for milk. The method differs from the milk test in that rapid counts on numerous other foods can be made with a single medium. The medium is sterilized, nonfat dry milk solids in solution. The time required for the reduction of methylene blue present in the medium by bacterial reductases present in the added sample indicates the number of bacteria present.

Acid production medium.--A medium of the following composition was prepared and adjusted to a pH of 7.10: tryptone 0.25 grams, proteose peptone (Difco) 0.5 grams, bacto-beef extract 0.1 grams, dextrose 0.15 grams, lactose 0.5 grams, maltose 0.5 grams, yeast extract 0.05 grams, sodium chloride 0.5 grams, bromthymol blue 0.005 grams, distilled water q.s. 100 milliliters. Tubes containing 5 milliliters of the medium were sterilized at 250° F. for 15 minutes, and cooled to room temperature.

Shellfish preparation.--Total bacteria counts were determined on unwashed, headless shrimp with shell and viscera intact and on shucked whole oysters. To increase the uniformity of the oyster samples, they were homogenized in a Servall omni-mixer. Shellfish samples were then diluted in the

(over)

 ABSTRACTER: Martin Heerdt

8.7 NEW STANDARDS FOR CANNED OYSTERS SET

Anonymous
Southern Fisherman 16, 55 (March 1956)

Oyster canners met on February 28, in New Orleans to consider the proposed temporary standards for canned oysters as drawn up by the group's elected committee and to decide whether or not to vote for adoption of those standards. About 40 canners, representing Louisiana, Mississippi, and Alabama were present for the discussions.

The standards that the committee had drawn up were presented along with a photograph to accompany definitions, to the Food and Drug Administration for discussion. The chairman, Mr. Strasburger, said that the FDA and the committee were in substantial agreement in regard to methods of grading and that the definitions were as close as possible to their understanding of the terms. The definitions were formed after a study of the normal breakage occurring in canned oysters.

The proposals were:

1. Definition--Whole Oysters
For purposes of classifying canned oysters for grading, a whole oyster shall be defined as: Any oyster consisting of a stomach section, a portion of the eye, or adductor muscle, and a major portion of the mantle. Some mutilitation and cutting shall not be considered as a bar to classification as a whole oyster.
2. Tolerance
The term "oysters" shall be used to describe the canned product when it contains oysters, as defined, and not more than 20 percent broken or pieces of oysters or tiny oysters.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

8.7 NRA TO ADOPT STANDARDS FOR MEAT MEAL AND MEAT AND BONE MEAL IN MOVE HAILED BY FEED MANUFACTURERS

Anonymous
The National Provisioner 134, 18 (April 7, 1956)

The National Renderers Association (NRA) has approved standards for meat meal and for meat and bone meal to assure greater acceptability of the products by the feed manufacturing industry. The nutrition council of the American Feed Manufacturers Association will recognize and recommend these standards in an effort to develop means of procuring feed materials of uniform quality. Dr. H. R. Halloran, head of the ingredients committee of the nutrition council, stated that the specifications are "equally important to suppliers for they will assist in production of more uniform material and wider acceptance of suppliers' products."

Mr. Richard B. Mortimer, president of NRA stated that the standards "will do much to upgrade the quality of our product and will help to meet the ever increasing competition of other feed ingredients."

The standards approved for the meals are as follows:
Protein as specified
Fat as specified
Fiber--maximum 3 percent
Ash--not more than 6 1/2 times phosphorus level
Moisture--5 percent minimum, 10 percent maximum
Total digestible matter--minimum 88 percent*
Screen: 100 percent to pass U. S. No. 7 Screen or No. 7 Tyler Screen
At least 98 percent to pass U. S. No. 10 Screen or No. 9 Tyler Screen

(over)

 ABSTRACTER: Neva L. Karrick

9.4 UNIVERSITY OF MARYLAND OPENS SEAFOOD PROCESSING LABORATORY

Anonymous
Maine Coast Fisherman 10, 13 (June 1956)

The University of Maryland has opened a new $229,000 laboratory for seafood processing research here.

The one story laboratory will conduct research in the cooking and processing of blue crab meat and will launch a bacteriological study of oyster problems.

The building was constructed at a cost of $204,000 and includes a chemical laboratory, bacteriological laboratory, media room, two processing laboratories, two cold rooms, kitchen, library and an instrument room. The university appropriated $25,000 to equip the laboratory with instruments and stainless steel furniture.

The primary function of the laboratory will be research of seafood industry in the Cheasapeake Bay area. The program will be expanded to consider other seafood problems including better methods of handling, development of plant techniques, processing, preservation, packaging, marketing and shipping.

 Reprinted in whole

RAPID BACTERIAL COUNT

STANDARDS FOR FEED MEALS

CANNED OYSTER STANDARDS

SEAFOOD LABORATORY

8.7 (Cross Reference: 6.19)

Color: Preferably golden brown to medium brown
Odor: Shall have a fresh meaty crackling odor
Uniformity: Product shall be uniform with respect to composition and grind throughout the lot

*Total digestible matter determined by method of Gehrt, Caldwell and Elmslie, Agricultural and Food Chemistry Journal, Volume 3, page 159, February, 1955.

All other assays according to Official and Tentative Methods of Analysis of the Association of Official Agricultural Chemists, current edition.

In other moves to broaden markets for products of the rendering industry, grants were awarded to several universities to study different aspects of feeding animal fat and protein to cattle, swine, and sheep.

9.4 (Cross Reference: 1.80)

7.85 (Cross Reference: 1.81, 1.85)

ratio of 40 grams of oysters or shrimp to 160 milliliters of sterile water of pH 7.0 and mixed in a Waring blender.

Experimental.--Determinations were made by adding a measured volume of sample to a tube of medium and incubating the tube at 95° F. The approximate bacterial count was indicated by the time required for the formation of a yellow color based upon the production of a definite amount of acid. A color change in less than 2 hours, in 2 to 2.5 hours, or in more than 2.5 hours indicated, respectively, a bacteria count of 10×10^6 or more, 5 to 10×10^6 or 5×10^8 or less per tube at the time of sampling.

Reduction medium.--For reduction a medium of the following composition was prepared and adjusted to pH 7.00: nonfat dry milk solids, 0.5 grams and distilled water q.s. 100.0 milliliters. Tubes containing 5 milliliters of the medium were sterilized for 15 minutes at 250°F. and cooled to room temperature.

Experimental.--Reduction determinations were made in two steps as follows: (1) by adding 0.5 milliliters of a standard methylene blue solution (made by dissolving one standard methylene blue tablet in 200 milliliters of distilled water) to 5 milliliters of medium and (2) by adding a measured volume of shellfish sample to this blue medium. A 5 milliliter aliquot representing one gram of sample is suggested. The inoculated tubes are then incubated at 95° F. and examined frequently. Disappearance of the blue color marks the end point of the determination. Blue color disappearance in less than 1 hour, between 1 and 2 hours, or in more than 2 hours indicates, respectively, an approximate bacterial count of 10×10^6 or more, 5 to 10×10^6, or 5×10^6 or less per tube at the time of sampling.

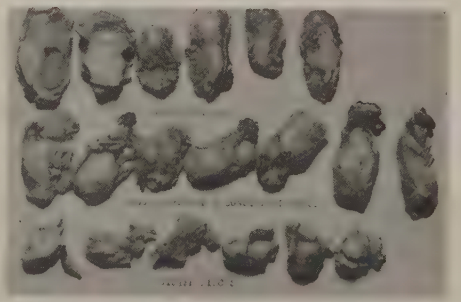
To obtain more accurate readings for any particular product, a plot of actual plate counts against rapid count time can be made for reference.

8.7 (Cross Reference: 1.81)

3. Definition--Broken Oysters

The term "broken oysters" shall be used to describe the canned product when it consists of broken oysters or a mixture of broken and tiny oysters.

The canners approved both the first and third proposals. On the second proposal, the canners voted to substitute the words "15 percent by weight" in place of the "20 percent" and to delete the words "or tiny oysters."



The picture above was used to explain the terms of the standards.

1.10 PRELIMINARY REPORT ON EXPLORATORY FISHERY FOR TUNA IN THE GULF OF MEXICO AND THE CARIBBEAN SEA. PART I. EXPLORATORY TUNA FISHING BY THE OREGON

Bullis, Harvey R.
Commercial Fisheries Review 17, 1-15 (October 1955)

(Abstract of this article appears under 2.12 page 1 - April 1956)

1.10 PRELIMINARY REPORT ON EXPLORATORY LONG-LINE FISHING FOR TUNA IN THE GULF OF MEXICO AND THE CARIBBEAN SEA PART II. LONG-LINE GEAR USED IN YELLOWFIN TUNA EXPLORATION

Captiva, Francis J.
Commercial Fisheries Review 17, 16-20 (October 1955)

(Abstract of this article appears under 2.1123 page 1 - April 1956)

1.10 GULF OF MAINE BLUEFIN -- TUNA EXPLORATION -- 1954

Murray, J. J.
Commercial Fisheries Review 17, 17-21 (June 1955)

(Abstract of this article appears under 2.12 page 7 - March 1956)

1.5 BRINE DIPPING OF HADDOCK FILLETS

Holston, J. and Pottinger, S. R.
Commercial Fisheries Review 17, 20-30 (October 1955)

(Abstract of this article appears under 3.230 page 9 - April 1956)

1.5 THE EXPRESSIBLE FLUID OF FISH FILLETS IV. THE EXPRESSIBLE FLUID OF ICED COD

Banks, A.
Journal of the Science of Food and Agriculture 6, 584-587 (October 1955)

(Abstract of this article appears under 2.19 page 7 - May 1956)

1.5 FREE SUGAR ESTIMATION IN CODLING (GADUS CALLARIUS) MUSCLE

Jones, N. R.
The Biochemical Journal 62, 7P-8P (January 1956)

(Abstract of this article appears under 7.599 page 17 - August 1956)

1.85 NEW FREEZER TRAWLER CALLED SUPER SHRIMPER

Anonymous
Southern Fisherman 15, 53, 56-57, 61, 63-64 (November 1955)

(Abstract of this article appears under 2.118 page 5 - April 1956)

1.85 RETAIL SHRIMP SALES INCREASE 84% IN MERCHANDISING EXPERIMENT

Anonymous
Southern Fisherman 16, 33 (February 1956)

(Abstract of this article appears under 3.26 page 3 - July 1956)

1.85 JANUARY TO APRIL DISTRIBUTION OF THE COMMON SHRIMP ON THE SOUTH ATLANTIC CONTINENTAL SHELF

Anderson, William W.
Special Scientific Report: Fisheries No. 171 (April 1956)

The results of 431 trawl hauls with a 10-foot try net, made on the Continental Shelf along the South Atlantic Coast of the United States, are summarized with respect to distribution of Peneid shrimp. It appears unlikely that commercial concentration of the common shrimp (Penaeus setiferus) or of the grooved or brown shrimps (P. aztecus and P. duorarum) occur on the Shelf outside the present limits of the fishery. The rock shrimp (Eusicyonia brevirostris) was taken in small numbers over a wide area and largely between 10 and 40 fathoms.

2.01 STUDIES ON PUTREFACTION OF AQUATIC PRODUCTS XV. COMPARISON OF PUTREFACTION FOR ROUND, FILLET, MINCED AND DENATURED FISHES

Simidu, Wataru and Hibiki, Sigeyuki
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 5, 388 (1954) (English abstract and figures)

Round fish was slower in putrefaction than fillets or minced muscle. There was no difference in the rate of putrefaction between the minced muscle and the same muscle cooked. The tenderness in the minced muscle has no relation to the rate of putrefaction.

2.01 STUDIES ON PUTREFACTION OF AQUATIC PRODUCTS XVI. CONSIDERATION ON DIFFERENCE IN PUTREFACTION FOR VARIOUS KINDS OF FISH (1)

Simidu, Wataru and Hibiki, Sigeyuki
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 5, 392 (1954) (English abstract and figures)

The greater ease of spoiling and greater poisonous nature of mackerel juice extract as compared with yellow-tail juice extract seemed not due to the difference between their extractives, but to the physical properties of the muscles.

2.111 ON THE CHANGE IN STRENGTH OF NETTING CORDS IMMERSED IN THE SEA I. RELATION BETWEEN THE STRENGTH OF SYNTHETIC NETTING CORDS AND THE TEMPERATURE, AND COMPARISON OF POWER OF VARIOUS KIND OF CORDS CHANGING WHEN IMMERSED IN THE SEA

Shimozaki, Yoshinori
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 5, 359 (1954) (English summary, tables, and figures)

2.111 MECHANICAL STUDIES OF FISHING NET MATERIALS IV. A METHOD OF MEASURING THE DIAMETER OF A NETTING CORD. V. RELATIONS BETWEEN SOME DESIGNATIONS ON THE FINENESS OF MANILA TWINES

Miura, Tetsuo
Bulletin of the Faculty of Fisheries, Hokkaido University 6, 208, 212 (November 1955)

The fineness of a cord is expressed in the value of the diameter at rupture measured by the use of the micrometer. The diameter at rupture and the substantial diameter are well in proportion, and proportional relation is given by formula (1) for cotton cord, and (2) for amilan cord.

2.111 NETTING AND ITS SECRETS PART ELEVEN: TABLES OF CALCULATIONS FOR THIRD ROW TAPERING

Jeffs, F. E.
World Fishing 5, 32 (April 1956)

4.15 STUDIES ON THE WHALE OIL X. FATTY ACIDS COMPOSITION OF THE PACIFIC BEAKED WHALE (BERARDIUS BAIRDII) OIL PART 4. ON THE LIVER LIPID

Saiki, Masamichi
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 5, 396 (1954) (English summary and tables)

The liver lipid of the Pacific beaked whale, which is taken from raw liver by extraction with hot alcohol, acetone and ether, contains 42.5 percent acetone insoluble matter, and has 15.46 percent unsaponifiable matter. The mixed fatty acids of this lipid are composed of 33.2 percent saturated acids (stearic 14.0 percent, palmitic 17.9 percent, and also myristic 1.3 percent) and 66.8 percent unsaturated acids (C_{14} 0.20 percent, C_{16} 7.4 percent, C_{18} 30.1 percent and C_{20} and above 28.1 percent).

4.15 (Cross Reference: 8.6179)

STUDIES ON THE WHALE OIL XI. MOLECULAR DISTILLATION OF THE PACIFIC BEAKED WHALE (BERARDIUS BAIRDII) LIVER OIL

Saiki, Masamichi
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 5, 401 (1954) (English summary, figures, and tables)

This liver oil contained from 2,000 to 34,000 USP units of vitamin A, showed remarkably high ratio 300/328 on whole oil and low Oser's factor, showing the presence of remarkable amount of kitol.

2.9 POISONOUS VERTEBRATES AND THEIR POISONS

Schiemenz, Hans (Humboldt Univ., Berlin)
Urania (Germany) 18, 345-50 (1955)
Chemical Abstracts 50, 1220 (January 1956)

A discussion of poisonous fish and reptiles and the nature of their poisons.

2.9 THE MICROBIOLOGICAL DETERMINATION OF THE ESSENTIAL AMINO ACIDS IN FISH PROTEIN

Lahiry, N. L. and Proctor, B. E.
Food Research 33, 87-90 (January-February 1956)

(Abstract of this article appears under 7.522 page 15 - August 1956)

2.9 BIOLOGICAL ASSAY OF THE TOXIN FROM SHELLFISH

Stephenson, N. R.; Edwards, H. I.; MacDonald, B. F.; and Pugsley, L. I.
Canad. J. Biochem. Physiol., 33, 849-857 (1955)
Food Science Abstracts 28, 35 (February 1956)

6.3 STUDIES ON ESSENTIAL OIL OF SEA WEEDS II. ON THE ESSENTIAL OIL CONTENTS OF VARIOUS KINDS OF SEA WEEDS III. THE CONSTITUENTS OF THE OIL OF DICTYOTA DICHOTOMA

Ando, Yoshiaki
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 6, 713-721 (1953) (English summary, tables, and figures)

6.3 LES ALGUES MARINES DES CÔTES PALESTINIENNES I. CHLOROPHYCEAE

Rayss, T. (Department Botanique, Université Hébraïque, Jérusalem)
Bulletin No. 9 State of Israel Ministry of Agriculture Division of Fisheries the Sea Fisheries Research Station, Haifa, Israel (September 1955)

6.3 ON THE REACTION OF ALGAL CELLS WITH SILVER NITRATE

Ogata, Eizi and Nagai, Susum
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 6, 750 (1953) (English summary and tables)

Ascorbic acid (reduced form) was the unique agent which reduced silver nitrate.

7.53 FAT AND MOISTURE CONTENT (DETERMINATION)

Anonymous
National Provisioner 53, 12 (January 21, 1956)

(Abstract of this article appears under 7.43 page 15 - July 1956)

7.53 DETERMINATION OF FAT IN THE WHOLE UNDISEMBOWELLED HERRING BASED ON THE CORRELATION BETWEEN FAT AND WATER

Brandes, C. H. and Dietrich, R. (Inst. Meeresforsch, Bremerhaven, Germany)
Fette u. Seifen Anstrichmittel 56, 495-499 (1954)
Chemical Abstracts 50, 2888 (February 25, 1956)

7.593 STUDIES ON THE ORGANIC PHOSPHATES IN MUSCLE OF THE AQUATIC ANIMALS I. ON THE DETERMINATION OF ADENIC SINEPOLYPHOSPHATES IN MUSCLE OF CARP

Saito, Tsunsyuki and Arai, Ken-ichi
Bulletin of the Faculty of Fisheries, Hokkaido University 6, 228 (November 1955)

The method of Cohn and Carter (1950) for separating adenosinepolyphosphates by ion exchange resin was used quantitatively.

7.80 VARIATION IN FLAVOR JUDGMENTS IN A GROUP SITUATION

Foster, Dean; Pratt, Cornelia; Schwartz, Noel (United States Testing Company, Inc.)
Food Research 20, 539 (November-December 1955)

This comparison of the round-table and individual test situations was designed to test the hypothesis that the observers' judgments in a round-table situation would be influenced by the responses of the other panel members, whereas the individual panel method would present an independent and non-manipulated judgment.

7.80 INSTRUMENTS TO CONTROL QUALITY PART 1

Gould, Wilbur A.
Food Packer 37, 30-32 (March 1956)

(Abstract of this article appears under 0.118 page 1 - August 1956)

7.80 A CRITICAL COMPARISON OF THE TWO-SAMPLE AND TRIANGULAR BINOMIAL DESIGNS

Filipello, F. (University of California, Davis, California)
Food Research 21, 235 (March-April 1956)

When the quality may be stated unambiguously, the two-sample design has been found more sensitive than the triangular. This difference in power of discrimination is explained by the fact that the just noticeable difference for the triangular is higher than for the two-sample design.

7.81 FUNDAMENTAL STUDIES ON THE DETERMINATION OF VOLATIVE BASIC NITROGEN BY AERATION METHOD I. STUDIES ON SOME DETERMINATIVE FACTORS INFLUENCING THE AMOUNT OF NITROGEN OBTAINABLE FROM AMMONIUM SULFATE SOLUTION II. STUDIES ON SOME DETERMINATIVE FACTORS INFLUENCING THE VOLATILE BASES OBTAINABLE FROM FISH MEAT

Kawabata, Toshiharu and Terui, Hiroshi
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 6, 741-749 (1953) (English summary, tables, and figures)

7.81 STUDIES ON VACUUM DISTILLATION METHOD FOR DETERMINATION OF VOLATILE BASE I. RELATION BETWEEN PERCENTAGE OF DISTILLED VOLATILE BASE AND pH OF DISTILLABLE SOLUTION WHEN AMMONIUM SULPHATE WAS USED

Fujii, M. and Noguchi, M.
J. Shimonoseki Coll. Fish., 4, 33-35 (1955)
Food Science Abstracts 27, 626 (November 1955)

7.81 ELECTROPHOTOMETRIC STUDIES ON THE FISH MEAT PUTREFACTION PROCESS. I. DETERMINATION OF AMMONIA-NITROGEN

Tagawa, S.; Yoshino, N.; and Miyauchi, K.
J. Shimonoseki Coll. Fish., 4, 21-24 (1955)
Food Science Abstracts 27, 624 (November 1955)

8.51 (Cross Reference: 1.1)

BIOCHEMICAL STUDIES ON SKIPJACK (KATSUWONUS VAGANS) IV. DISTRIBUTION OF AMINO-ACID IN PYLORIC COECA

Kakimoto, Daiichi; Kanazawa, Akio; and Kashiwada, Ken'ichi
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 8, 729 (1953) (English summary and figure)

Amino-acids contained in pyloric coeca of skipjack were examined by paper partition chromatography.

8.51 (Cross Reference: 1.70, 6.86)

PHYSICO-CHEMICAL STUDIES ON THE SKIN AND LEATHER OF MARINE ANIMALS. X. ON THE PROTEIN IN SHARK SKIN. XI. THE TRYPTIC DIGESTION OF THE COLLAGEN IN FISH SKIN

Takahashi, Toyo-o and Takei, Makoto
Bulletin of the Japanese Society of Scientific Fisheries 20, No. 5, 411 (1954) (English summary, figures, and tables)

The tryptic digestion of the collagen in fish skin was studied with the intention of obtaining some information for the bating of fish skin.

LIST OF PUBLICATIONS REGULARLY ABSTRACTED

Analyst
Analytical Chemistry
Archives of Biochemistry and Biophysics
Biochemical Journal
Bulletin of the Faculty of Fisheries, Hokkaido University
Bulletin of the Japanese Society of Scientific Fisheries
California Fish and Game
Canadian Fisherman
Canadian Journal of Chemistry
Canadian Journal of Technology
Canner
Chemical Abstracts
Chemical and Engineering News
Chemical Engineering
Chemical Processing
Chemistry and Industry
Commercial Fisheries Review
Drug and Cosmetic Industry
FAO Fisheries Bulletin
Federation Proceedings
Feedstuffs
Fisheries Newsletter (Australia)
Fish. Res. Bd. Can., Prog. Repts. Atlantic Coast Stas.
Fish. Res. Bd. Can., Prog. Repts. Pacific Coast Stas.
Fishing Gazette
Flour and Feed
Food Engineering
Food Manufacture
Food Packer
Food Preservation Quarterly
Food Processing
Food Research
Food Science Abstracts
Food Technology
Frosted Food Field
Gourmet
Industrial and Engineering Chemistry
Industrial Refrigeration
Institutions
Journal of Agricultural and Food Chemistry
Journal of Applied Chemistry
Journal of Biological Chemistry
Journal of Nutrition
Journal of the American Chemical Society
Journal of the American Dietetic Association
Journal of the American Oil Chemists' Society
Journal of the Association of Official Agricultural Chemists
Journal of the Fisheries Research Board of Canada
Journal of the Science of Food and Agriculture
Maine Coast Fisherman
Meldinger Fra SSF (Herring Industry, Norway)
Modern Packaging
Modern Refrigeration
National Fisherman
National Provisioner
Nature
Nutrition Reviews
Pacific Fisherman
Pan American Fisherman
Poultry Science
Practical Home Economics
Progressive Fish-Culturist
Quick Frozen Foods
Refrigerating Engineering
Report of the Food Investigation Board (Great Britain)
Science
Southern Fisherman
Trade News (Fisheries Department, Canada)
Western Fisheries
World Fishing

Articles chosen for abstracting or inclusion as bibliographical references are those deemed of interest to the commercial fisheries and to fishery technological laboratories. Occasionally pertinent articles from sources other than the above listed publications are included. Biological papers are generally omitted.

- - -

Editorial Clerk (Typist)--Gladys K. Chandler

9.2 UNITED STATES AND ALASKA FISHERIES PRODUCTION, 1955

Anonymous
Commercial Fisheries Review 18, 36-37 (January 1956)

(Abstract of this article appears under 1.0111 page 1 - July 1956)

9.2 SARDINES --1955 GAIN SUBSTANTIAL BUT NOT SPECTACULAR

Anonymous
Pacific Fisherman (Yearbook Number 1956) 139-145 (January 25, 1956)

(Abstract of this article appears under 1.20 page 3 - July 1956)

9.2 FISHERIES OF THE UNTIED STATES AND ALASKA, 1955

Power, E. A. and Peterson, C. E.
Fishery Leaflet 393 (Revised March 1956)

This leaflet makes available in one publication preliminary statistical information on numerous categories of the fishing industry in 1955. Comparative data for earlier years are also included. For those phases of the industry, for which preliminary estimates are not available, the most recent information is listed. The leaflet is revised and reissued annually with new data for the year just concluded. All data refer to the United States and Alaska unless otherwise noted.

9.3 IDEAS FOR LOWERING BOAT INSURANCE COSTS

Sachs, Jerome
National Fisherman 52, 13 (March 1956)

(Abstract of this article appears under 2.119 page 19 - July 1956)

9.3 U. S. IMPORT CLASSIFICATION AND DUTIES OF FISHERY AND WILDLIFE COMMODITIES

Sandberg, A. M.
Fishery Leaflet 417 (January 1, 1954 Edition, Revised April 1956)

9.3 SANTIAGO NEGOTIATIONS ON FISHERY CONSERVATION PROBLEMS AMONG CHILE, ECUADOR, PERU, AND THE UNITED STATES

Anonymous
Commercial Fisheries Review 18, 9 (May 1956)

9.6 FISHERY PUBLICATION INDEX, 1920-54

Anonymous
Fish and Wildlife Service, Circular 36 (1955)

Publications of the Bureau of Fisheries and Fishery Publications of the Fish and Wildlife Service by Series, Authors, and Subjects.

9.6 COMMERCIAL FISHERIES REVIEW INDEX FOR 1948, VOLUME 10

Fish and Wildlife Service, United States Department of the Interior, Washington, D. C. (August 2, 1955)

9.6 FISHERY STATISTICAL PUBLICATIONS OF THE FISH AND WILDLIFE SERVICE

Power, E. A. and Finley, B. E.
Fishery Leaflet 432 (January 1956)

9.11 MID-PACIFIC OCEANOGRAPHY, PART VII. HAWAIIAN WATERS SEPTEMBER 1952 - AUGUST 1953

Seckel, Gunter R. (Pacific Oceanic Fishery Investigations, Honolulu, T. H.)
Special Scientific Report: Fisheries No. 164 (November 1955)

In conjunction with the Pacific Oceanic Fishery Investigations' study of the tuna resources of the central Pacific, the hydrography of Hawaiian offshore waters was investigated. This report covers cruises 17, 20, and 21 of the Hugh M. Smith, which took place during September 1952, February to April 1953, August 1953, respectively. On Hugh M. Smith cruise 26, May and June 1954, additional oceanographic data were obtained in conjunction with skipjack scouting. The principal observations consisted of routine temperature and salinity sampling together with 200-meter oblique plankton hauls. Reliable inorganic phosphate-phosphorus data were obtained on cruise 21.

9.13 BIOLOGISTS LAST WILL

Anonymous
Sport Fishing Institute Bulletin No. 55 (June 1956)

Dr. Stanley Snieszko emphasized the need for extreme caution by fishery workers in contact with urethane, a drug widely used to anaesthetize fish for many purposes. He pointed out that urethane is a strong carcinogenic agent. Three possible courses of action were discussed: (1) use effective protective clothing, (2) prepare a Last Will and Testament, or (3) use a substitute anaesthetic such as tricaine methenesulfonate (MS_{222}).

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0.32 STUDIES ON MUSCLE OF AQUATIC ANIMALS XIII. ON SOLUBILITY OF COAGULABLE PROTEIN IN NEUTRAL SALT SOLUTIONS XIV. EFFECT OF NEUTRAL SALTS ON PROTEIN DENATURATION

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2.112 RECENT DEVELOPMENTS IN FISHING-VESSEL DECK GEAR

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